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DECEMBER, 1900. VOL. XVI. No. 6.

The Geographical Journal

INCLUDING THE PROCEEDINGS OF THE ROYAL GEOGRAPHICAL SOCIETY.

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The

Geographical Journal.

No. 6. DECEMBER, 1900. Vol. XVI.

THE PRESIDENT'S OPENING ADDRESS, SESSION 1900–1901.*

The most important geographical event since the close of the last session has been the return of the expedition of the Duke of Abruzzi from Franz Josef Land. His Royal Highness has the great merit of having personally organized and fitted out the expedition in every detail; and an expedition has seldom sailed which has been so carefully and thoroughly equipped. Its geographical results are of great importance, for it has finally discovered the northern limits of the Franz Josef group, and confirmed Nansen's discovery of a deep ocean to the north; while the sledging party under Captain Cagni reached the highest northern latitude yet attained. I had a very interesting conversation with the Duke of Abruzzi at Christiania, and, if it can be arranged, his Royal Highness will be pleased to give us an account of his expedition in the course of the session.

The Danish expedition to East Greenland, under Lieutenant Amdrup, has also returned, after successfully continuing the work of Dr. Nathorst last year, while a Norwegian whaler was able to follow the coast to 75° 30′ N. Thus the dotted line which has so long indicated the supposed position of the East Greenland coast on our maps will now give place to a definite surveyed line; thanks chiefly to the persevering efforts of Danish geographers and explorers since the days of Graah.

We are still anxiously waiting for news of the expeditions of Sverdrup and Peary up Smith sound. The *Windward* went out to bring them succour, but she has not yet returned.

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* Delivered at the Meeting of the Society, November 12, 1900.

The two recent expeditions to the antarctic regions have both supplied us with valuable information. In Dr. Cook's work there are extremely interesting appendices by members of the Belgian expedition; and Mr. Borchgrevink's paper is accompanied by a very able report on the meteorology and magnetic work of Sir George Newnes's expedition by Mr. Bernacchi, and by a map drawn by Mr. Colbeck, based on his own survey. The biological collections of Sir George's expedition have arrived, and have, I understand, been handed over to the authorities of the British Museum at South Kensington.

Our own antarctic expedition is now, at last, making progress as regards equipment and other arrangements. The ship is in an advanced state, and we have had every reason to be satisfied with the work of the Dundee Shipping Company. Captain Scott, R.N., the commander of the expedition, was only able to take charge last August, but he has already shown that he possesses many of those qualities which are essential for so difficult and responsible a post.

The German expedition is far more advanced than we are, in every department of its work, under the direction of its able and accomplished commander, Prof. von Drygalski; but this is because his Committees have seen the wisdom of giving him a perfectly free hand. I am glad to say that the commanders of the two expeditions have had an opportunity of becoming friends, and of exchanging views during the autumn; and Captain Scott, if not too much trammelled by Committees, will soon make up for lost time. Captain Scott has also derived very great advantage from his intercourse with the scientific men who are conducting dredging operations and physical investigations on board the *Michael Sars* on the Norwegian coast. Dr. Hjört and our gold medallist, Dr. Nansen, have given Captain Scott the results of their great experience as regards the best nets for dredging, and the latest inventions connected with oceanic researches generally. They spared no pains to inform him on these points, and, as they are gifted with remarkable powers of exposition, the advantage derived from conversations with them is very great. Captain Scott will, I am sure, desire to join in a cordial expression of thanks from this Society to our Norwegian colleagues.

Our friend Dr. Sven Hedin has, during the past year, been actively at work in the Lob-nor country and the basin of the Tarim; and I believe that his archæological discoveries will throw a flood of light on the past history of that region. The complete record of the scientific work of Dr. Sven Hedin's former journey has, meanwhile, been published in a special number of *Petermanns Mitteilungen*, fully illustrated by maps. Another important geographical work which has appeared during the recess, is the statement of the Argentine case in the boundary arbitration now in progress. It is very fully illustrated by maps and photographic views. Still another excellent book is a 'Glimpse of

Guatemala,' which is most beautifully illustrated, with valuable chapters on the Maya ruins, by Mr. Maudslay, and a most charming and interesting narrative of travel by Mrs. Maudslay. The biography of my old friend Mr. Oswell, the companion of Livingstone, with an introduction by Mr. Francis Galton, is very interesting, and contains a good deal of hitherto unpublished matter respecting the early exploration of Southern Africa. The Duke of Abruzzi's ascent of Mount St. Elias, by Dr. Filippo de Filippi, is a beautifully illustrated work, with a well-written and interesting narrative.

It is in Africa that the greatest amount of geographical work has been done this year. But a review of it must, alas! commence with a reference to the loss of a valued young explorer. It was only last session that Captain Wellby's father read us the account of his gallant son's splendid geographical achievement in marching from Abyssinia to the Nile. You will all remember how we looked forward to welcoming him on his return from the front. Now that can never be. Captain Wellby has fallen, fighting for his country in a most righteous war. It was a glorious death, fitting close of an adventurous and active life. We are left to mourn the death of a young officer who was a great explorer and an ornament to the army. His noble example has been followed by others; for there has been remarkable activity in the exploration of Africa this year. Major Gibbons has followed Mr. Grogan from the Cape to Cairo. Mr. Moore has returned after his important investigation of the Central African lakes. Mr. Harrison has brought home an admirable map of the region between Lake Rudolf and Addis Abeba. Our gold medallist, M. Foureau, has safely returned after his wonderful journey across the Sahara, of which he has promised to send us some account. Last, but certainly not least, Dr. Donaldson Smith, who is an old friend and known to us all from his previous work, has made very remarkable journeys, involving new discoveries between Lake Rudolf and the Nile; and I am sure we are all delighted to welcome him here this evening.

Already the benefits to geographical knowledge of the effective occupation of the Sudan are beginning to be felt; the first sheets of the new maps of the Nile, as far as the Bahr Ghazal, the results of the survey under Colonel Talbot, have reached us; while Sir W. Garstin's journey up the Nile to the lakes will no doubt yield further important results in the same direction. Major Wynn has gone out to Abyssinia, and will shortly be followed by Major Austin and Major Bright, the two latter to the Sudan; and between them we may expect great accessions to our knowledge of the eastern tributaries of the Nile, and of their basins.

From South Africa again we have in the map room several sheets of the maps which have been made during the war by the surveyors sent out by the Intelligence Department. And in this connection I am pleased to learn that serious steps have been taken to carry out

administrative surveys of all those territories in Africa which are directly dependent on the Home Government, and that in conjunction with the other European Powers which have African possessions.

AN EXPEDITION BETWEEN LAKE RUDOLF AND THE NILE.*

By Dr. A. DONALDSON SMITH.

In 1895, when my first expedition reached Lake Rudolf, it had been a whole year on the march, and had been successful also in exploring much more new country than I had anticipated, so I contented myself in making a fortnight's journey up the Mela river. On this side journey, however, I made up my mind, on looking across a vast expanse of plain towards the west, that some day I must pursue the setting sun from Rudolf to the Nile, and I continually watched for an opportunity to satisfy my desire. Since I could not do this at once, I filled in a part of the intervening time by a journey through some of the unknown parts of the Khingan range in Mongolia in 1897, a short account of which was published in the *Geographical Journal* of May, 1898.

The whole of the winter of 1898–99 I was in the jungle in Somaliland, hoping for an opportunity to cross the border, but owing to political reasons and to the gratuitous interference of the Consul-General, I was unable to put my project into execution until midsummer. During May and June, while negotiations with the Foreign Office were under way, I employed my time in recruiting twenty-eight Sikhs and Gurkhas in the Punjab. I thought it advisable to enter *viâ* Kismayu, but the Mombasa local authorities stopped me. To be brief, I fitted out three distinct expeditions before I managed to get finally out of the reach of incomprehensible officials. I started from Berbera on August 1, 1899. After the first march eleven of my Sikh ex-Sepoys deserted, having become aware that they must sweat occasionally, and that they could not be supplied with all the manifold luxuries they were accustomed to in the Indian army. Knowing that I should never succeed if I took one of the officially recognized headmen with me, I had great difficulty in getting Somali camel-men, since all the Berbera headmen formed a ring against me. Several camel-men having deserted me at Hargeisa, and fearing further official interference, I started across the Haud with only seventeen Somalis, and as many Gurkhas and Sikhs, besides my assistant, Mr. Frazer, and my excellent Goanese cook, kindly lent me by Captain P. Z. Cox. During the journey to the Shebeli river *viâ* Milmil, Sesebane, and

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* Read at the Royal Geographical Society, November 12, 1900. Map, p. 712.

Sheneli, I increased my following to forty-eight men. Near Milmil a small caravan of camels and women which was following us was attacked by three highwaymen. One of the robbers was captured by my boys and brought before me. He was a lad of eighteen, with wiry limbs and an intelligent expression, and struck me as a likely recruit, and a better brigand than the majority of my men. So I contented myself by making him march handcuffed for a day, and then enlisted the homeless fellow as a camel-man. He became known as Ali Hatbury, or "Ali of the handcuffs," and proved one of my best boys.

My surveys began immediately upon leaving Sesebane. Although I had with me all the most recent maps, the "tug" Fafan had been given no resting-place by cartographers. All the way to the Juba river we had work to do filling in what had been to all intents and purposes a blank upon the maps, except where I came upon my old line of march in 1895 at Turr. Sportsmen had knocked about the country in places, but they evidently never thought that Longfellow's idea of a brook applied to a tug or wady from the different positions the poor sandy river-beds were made to assume.

At the end of our march on September 8, we reached the Shebeli river at a spot called Godi, over 400 miles from Berbera by road, and crossed without unloading the camels. It contained only from 2 to 3 feet of water in its deepest part. So dry was the country about the river that I pitched my camp in a dark grove of immense cedar trees within a few yards of the stream, not having to fear malarial poisoning. Not a single mosquito disturbed our rest at night. On September 11 we started west again across a rich river-made plain, passing numerous villages of Aulihan and Dagodi to the foot of the highlands, which intervene between the river Web and the Shebeli. We followed up a tug to its sources in these highlands, and found many pools of water in it. Considering the extreme dryness of the season, I believe this tug must be usually a flowing river. The natives would sell us nothing at any price, although they were rich in live stock. For the next few days we experienced a delightful change from the trying heat of the low plains, where the mean temperature for the twenty-four hours was over 90° Fahr. The plateau was only 2500 feet above the sea, but that was a sufficient elevation to give a slight tonic effect to the atmosphere. The land was only suitable for grazing purposes to a limited extent, since the granite and iron ore, of which the hills were composed, was bare, or else covered with a thin layer of sub-soil, which supplied nourishment to a tangled mass of mimosa and acacia trees and bushes. Inhabitants were consequently very few, and giraffes very plentiful. Water is to be obtained in holes in the rock.

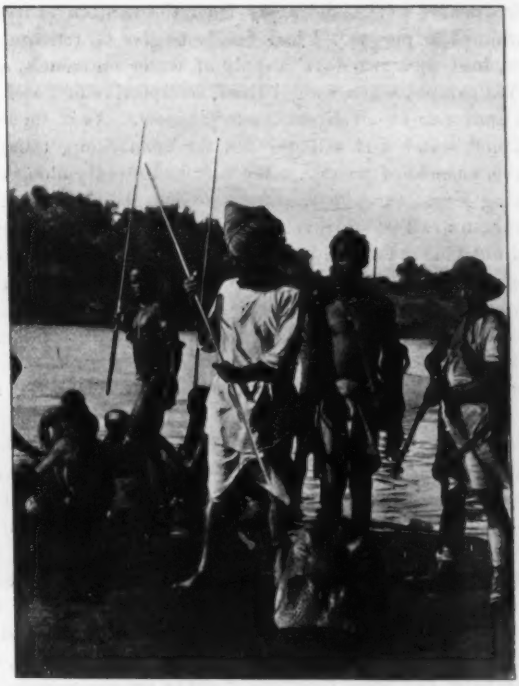
Near some villages called Mucha, which we reached on September 14, there were some remarkable deep rock wells. Two days after leaving these we descended from the plateau and reached my old line of march

at Gohule. From here until we reached the Boran at El Dere I cannot add to the description I gave to you of the country when I read my paper before the Society in 1896. The rivers Web and Juba had only half their usual supply of water. The people were flourishing, and nothing could have exceeded their meanness in not wishing to sell us food, which made it most difficult for me to keep my men supplied, there being also little game on our line of march. The Boran, on the other hand, were most friendly. I must here refer to the Abyssinian method of annexation. In 1895 I saw the worst side of their treatment; but on my recent journey, I found that their treatment of tribes, once thoroughly brought to submission, was commendable. In their first attacks they are certainly very cruel, but later, when the natives have been so harried that they look upon their masters with the greatest respect, they are given back a good proportion of their belongings and very nearly their original self-government, but a moderate tax being imposed. From the Somalis to the Boran I was surprised to find the natives quite as rich apparently as they were before they had come under Abyssinian rule.

Since I could fill in many blank spaces on my former map before reaching Lake Stefanie, I started survey work again at El Dere, and continued it to the Nile. Marching in as straight a line as possible from Berbera, El Dere may be considered to be 750 miles by road and the same distance from the Nile. Three long marches from El Dere to Le lead us through a very wooded and broken country, where elephants abound and man is a rare visitor. There are many mountains scattered about, principally of limestone rock, and the deep wells at Le I now believe to have been originally formed by the disintegrating effects of water on chalk, in which the natives have actively assisted. My Somalis gave me infinite trouble and annoyance. They were never satisfied unless they had over ten pounds of camel meat or mutton a day per man, and when food was scarce I had to be constantly on the alert to prevent them from poisoning my transport animals, so that they could eat the meat, or from stealing sheep, but they were not, however, as miserable petty thieves as most of my Indians. All but four of them mutinied at a place called Gof on November 4, and remained out over night, putting me in a decidedly disagreeable situation. If I call my Somalis howling hungry humbugs, I describe some bad points of their character, but it would be unjust in me not to mention their superb physical condition, swift-footedness and endurance, and their intelligence, which made them compare favourably with the Indians. Of my nine Gurkhas, five only were pure-blooded men from the backwoods of Nepal, and these were among the best men in camp. The other four Gurkhas had Rajput or other blood in their veins, and it is with regret that I look upon them as human beings. These latter, and as many more Sikhs, continually

strove to commit suicide by hiding if the march was long, and gave me and the Somalis infinite trouble in hunting them up. Two Indians were cunning enough to evade the Somalis search-parties sent after them at different points on the journey, and were never heard from again. Whenever the march was protracted over five hours, either my assistant or I fell back far to the rear of the caravan to protect tired Indians from themselves.

Between Goff and Lake Stefanie the Abyssinian highlands are



Mursu. Sikh. Somali. Gurkha.

ON THE OMO AT MURSU.

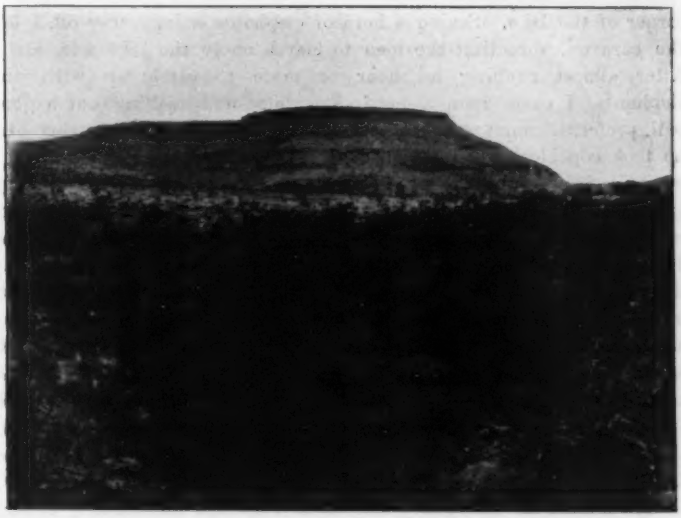
continued south as a long mountain chain all the way to Mount Koroli and Marsabit, near the southern end of Lake Rudolf, a fact that I was not aware of on my first journey. Proceeding westward three marches from Gof, and passing Egder, we arrived on November 8 at a large settlement called Gorili, at an elevation of 3000 feet, where the people welcomed us with large vessels of honey and milk. There were Arab and Somali traders among them from Kismayu, buying ivory in exchange for cattle.

On the next day we rose over 1500 feet to Mega, a beautiful broad open meadow or series of meadows between mountain peaks, into which tiny watercourses trickle, and where there was a delightful freshness in the atmosphere and in everything living. Besides the many cattle, sheep, goats, and donkeys which were to be seen grazing on the fine green grass, we were much impressed by the numerous droves of sleek ponies. For some reasons the natives west of Egder did not wish us to be a witness of their wealth, and whenever we managed to get a guide from them, he persisted in taking us by the most unfrequented paths, and away from the western course, which I was determined to pursue. I had finally to give up trusting in guides altogether, load up a two days' supply of water on camels, and march ahead. We camped when we got tired, irrespective of water or people, and then sent men in all directions to prospect. As it turned out, we usually found water and villages not far from camp, though with a considerable amount of trouble. We marched rapidly along easy paths after leaving Mega, through the same green upland basins, for a little over four hours, all of us revelling in the delicious cool atmosphere. The good old Gurkha Havildar voiced the sentiment of the crowd by exclaiming, "Ah! Sahib, if we could always have it like this."

We were at an elevation of over 5000 feet, when suddenly, on rounding a little promontory, the caravan was brought to an abrupt halt. We found ourselves perched on the edge of a precipice that sheared off almost perpendicularly down to a broad plain 1700 feet below us. Across the plain, some 30 miles to the west, rose what appeared to be a low mountain range, the southern extension of the Tertala mountains; but the plain itself we found to be over 3000 feet above the sea-level, a no mean elevation compared to the valleys of Lake Stefanie and Rudolf. On my first journey I crossed this plain 80 miles north of here, where it was only a narrow valley running up to its origin in the Amara mountains. The view was, indeed, magnificent from this great wall, the western edge of the Boran highlands, which run from the Amara to Marsabit, but it was appalling when I came to consider how my poor camels were to get beyond it. To my surprise, we found a winding path had been laboriously made by the natives for their donkeys, many stones, weighing two or three tons, having been rolled aside. We set to work on this road, and after a day's hard labour got it in fit enough condition to take the camels down empty. All the loads were carried down by my men, and then the long line of grunting, stumbling, patient "ounts" were shoved and lifted after. In spite of the inimitable Kipling, I have the greatest respect for the long-suffering camel. On this occasion only one animal was injured, but he was afterwards consumed by us to his last marrow-bone. Thus you see that the good that a camel does is not interred with his bones.

There were numerous villages about the foothills and on the plain,

and many natives helped us down the paths. The most important settlement, about an hour's march from the foot of the mountain, called Saki, was in a most flourishing condition, judging from the large numbers of cattle which the people owned. A couple of marches west of Saki we got into a very bad washed-out stony country, where the plain was cut into hideous designs by the rushing of the waters in times of flood. A guide whom we had got at Saki insisted on going to the north, which I would not do, so I felt that I had only myself to blame for getting into the bad land. It took five long marches to get across the plain, on account of several stretches of this character. A specimen of one of the tiny gazelle, or dig-dig, of this plain, which I



BAD LANDS, NEAR SAKI, EAST OF LAKE STEFANIE.

presented to the British Museum, has been proven to be new to science by Mr. Oldfield Thomas (*Madoqua guntheri smithii*). On November 19 we were among the mountains again, and not far from the south-east end of Lake Stefanie.

There was one rather isolated mountain called Janissa, 5600 feet high, which I decided to ascend while my camels were resting. From the top of it I got a splendid view, and picked up most important points of my previous journey—Mount Kanjaro, the Tertala range, Lakes Stefanie and Rudolf, and Mount Koroli—and could thus check my work, which I was most pleased to find correct. The trip was not without other advantages also, for on the very top of the mountain

I bagged two specimens of *Cervicapra chanleri*, a beautiful antelope not known to exist near Lake Stefanie. Two marches beyond Mount Janissa we came to what appeared to be an enormous barnyard, with a solid stone floor, and in the centre a bubbling warm spring. The water was sparkling with carbonic acid gas, tasting like acidulated seltzer, and it was evidently the drinking-place of many scores of elephants, judging from appearances. Elephants were ubiquitous; you could scarcely move in any wooded valley without disturbing many of them. The next day we were well down in the valley of Lake Stefanie, and looking forward to plenty of fresh fish and plenty of water for washing.

On November 26 we made an afternoon march to the south-east corner of the lake. Seeing a herd of elephants a long way off, I left the caravan, directing the men to march on to the lake and camp. After almost running an hour or more to catch up with the elephants, I came upon a herd of buffalo, and picking out a good bull, preferred him to the tuskers. Killing the bull and cutting him up took considerable time, and it was not until near sunset that I came in sight of the camp. To my horror I saw nothing but blazing grass where the camp should have been, and on some rising ground, covered with smoking ashes, stood my boys, looking like the central figures in one of Doré's conceptions of the Inférno. I certainly thought my ship had been burnt up, but my boys were only resting a moment after their heroic efforts to save the kit, which they had accomplished to the last camel-blanket. No wonder my camel-men's faces looked doubly sad when they brought me a tin of water and asked me to taste it. It was the briniest water I ever touched, and then I too felt sad. I learned that the lake with its undrinkable water was 2 miles away over a sea of mud covered with dead fishes. I only had two small barrels of water in camp, which I always carried for emergency, and these I divided immediately among the poor parched boys, who had been fighting the fire. Every man was tired, and yet I had to send at once several boys with camels to travel all night back to the mineral spring and fetch water the next day. Here is where the Somalis showed their pluck. Not a man that I ordered out objected, since it was a question of life or death. Other Somalis I sent in all directions to follow the paths made by the countless myriads of animals, and learn where they drank. Most of the Indians were dead to all intents and purposes, and considered themselves to belong already to another world. Luck was not so much against us, however, for in two hours my camel-men had found a spring of fresh water by following elephants' spoor, and soon after this the Indians were resurrected by a gallon of water each.

I will pass over our journey from this point to Lake Rudolf, which we reached on December 10. The formerly rich tribe of Rusia had

ceased to exist, and except a few representatives of the Hamar Koki tribe, we saw no human beings at all until we reached the river Nianam. The water was 12 feet lower in the shallow lake than it was in 1895.

I was quite surprised at first at the manner of our reception by the Murle and by their poverty. The rich villages that welcomed us in 1895 did not exist. There were only a few little groups of huts, principally on the west bank of the river, that showed the remnants of a once large and flourishing tribe. We spent nearly a whole day endeavouring to get the people to come to us; but finally, when we

GAZELLA GRANTII BRIGHTII.

gained their confidence, they were most eager to assist us. The secret of the natives' distress was to be found in Abyssinian raids. With the help of the natives and their canoes we easily crossed the Nianam, which was half dried up like all the streams we had crossed. On my first journey I followed up what I supposed to be the Nianam for a long distance to Mela; but since I was there that illustrious explorer, the late Captain Bottego, discovered another river, the Omo, coming in from the west. It is clear to me now that my river, which I will call the Mela, and the Omo together in equal volume join at Gumba to form the Nianam, the name given by Count Teleki to the large stream flowing into the lake.

A remarkable change now occurred in the fauna. Not only did

we find a completely different set of birds between the Nianam and the Nile, but scarcely any of the mammalia that we had been accustomed to were to be found in this western section. The Soemerings gazelle had given place to the larger Boran gazelle, and now this had disappeared, to make way for a smaller variety without any longitudinal black stripe on its side, and which Mr. Thomas has proved to be new after examining a specimen which I have given your museum (*Gazella grantii brightii*). The bouncing, nervous, long-necked Waller's gazelle, which had been a constant companion, was nowhere to be seen, but oribi and reed-buck took its place. Speake's gazelle was replaced by the beautiful *Gazella thomsoni*. The hartebeests, as a matter of course, thought it best to give themselves differently curved horns, and to go under the name of *Bubalis lelwel*, Heuglin. The birds were represented by curious scarlet-breasted barbettes, with their enormous dentated bill for cracking hard berries; by curious tiny flycatchers, with large scarlet wattles around their eyes; and by more than a hundred other different species, all of them strikingly beautiful, belonging principally to the West African types. Many troops of monkeys made the tall forest about the rivers and ponds ring with their chatter. The most beautiful of these, a large horse-tailed colobus (*Colobus guereza poliura*), was found to be new on examination of some skins which I gave to the museum.

I may mention here that from the time we left the Boran gallas until we reached Arabic-speaking natives near the Nile, we could communicate with none of the tribes except by signs, unless we remained long enough at some village to pick up a few words of the vernacular. I had hoped to find some Masai, but there were none. The whole way to Tarangole the natives refused to give us guides, although they were friendly in other respects. This was to be accounted for, I suppose, partly in my refusal to pursue any other than a westerly course, when the natives advised my going north or south, or even east again, and partly through fear that the guides would be killed by their hostile neighbours. We kept our course, however, although we literally got into many a hole, and struck out each morning regardless of paths, waterways, or dire prophecies on the part of the natives.

The day after Christmas we bade the Murle good-bye, and struck out in a northerly direction that would bring us to the Omo, near the point where that stream makes an acute angle as it bends from north to east around the Mela hills. At the end of a long march over a grassy open plain, we came to a place where the loose fireclay which underlay the sub-soil of the plain had been cut away by the action of waters to a depth of 50 feet, and in the deep round basin a dense forest of giant sycamores, mimosa cedar, and tamarind trees stretched before us for about 2 miles. Finding plenty of elephant paths, we wandered through the dark woods the next morning until we came to a pretty lake a mile

long, in which a school of over a hundred hippopotami disported themselves. The forest was alive with animal and bird life. The elephants were, indeed, so numerous that their stench was most disagreeable. From here to the river the land was so cut up that we did not reach the Omo until we had made a second march in the afternoon. I may say that most of our day had been spent in passing around and over little hills of crumbling clay. The Mursu, whom we found on the banks of the Omo, had escaped the raids of the Abyssinians, and were in a most flourishing condition. After we had shot a couple of hippos for them, they became most friendly, and brought us much food, consisting of durrha, or sorgham, lentils, beans, maize, and dried tamarinds. I bought a small tusk or two from them at first to start trade; but when I discovered a long line of ebony-like forms bearing about a ton of ivory upon their shoulders to my camp, I had to cry a halt, as it was impossible for me to transport more ivory than I then had with me.

The Mursu and Murle are very identical in speech, customs, and appearance, but the Mursu have more of the warlike spirit of the Turkana than the Murle. The Mursu shave the hair well up from above their ears, and also behind the head, a custom observed by the Dume, Bunno, and other tribes living to the north of Lake Stefanie. Moving along the river with camels was hard work, owing to the thick forests, in which much cutting had to be done. Several of my camels died from eating a poisonous vine, and many were made so ill that they never recovered. I have found it always dangerous to allow camels to remain in forests along rivers or lakes for any length of time.

On January 3 we left the river, and, proceeding west, arrived on the second day's march at another little pond at a point where several river-beds unite in one very deep and wide ravine. Thence our route lay across a fertile river-made plain to the base of a low mountain range. I have little doubt, from what I saw of the valleys passing to the right and left of the various mountain ranges and from levels taken, that Lake Rudolf, the Nile, and the Sobat were once united in a vast inland sea. A couple of hours' climb on January 6 got us over the crest of the first range of hills and on to a valley 15 miles broad, that provided excellent grazing to the numerous domestic animals which the natives of these parts owned. The waterways contained plenty of water in pools, and there were many broad stretches of open pasture, while the lower hills surrounding the plain were almost treeless, but covered with fine green grass. On the west, a splendid mountain range ran for 20 miles along the length of the valley; the highest point, Mount Etua, over 7000 feet high, stood out in bold relief as a bare-pointed volcanic remains—a splendid point for surveyors, and a magnificent mass from an artist's point of view. We saw this point from the Omo river, and did not lose it until we were 40 miles the other side.

Almost all the natives fled to the hills on our approach, and seemed

inclined to fight. From their long parallel-sided shields, their Masai-like spears, and their tall athletic build, I made them out to be a branch of the Turkana. A lot of about twenty warriors attacked two of my camel-men one day, who were loitering behind the caravan with my sheep and goats, and were only driven off by my boys firing at them. This was the only time on the journey that the natives attempted hostilities. The people here call themselves Mushas, but I could not get any vocabulary from them, as I only managed to get speech with them on

MURSU ON THE RIVER OMO.

two or three occasions before I was about to quit their country. We kept pretty much to the valleys, which were at an elevation of 1700 feet as we progressed through their country for seven long marches, occasionally going over some mountain passes, where stretches of open upland meadows and grass-covered hills made me feel that I should be wearing tweeds instead of khaki. In such places there were usually a good number of small villages, but occasionally, where the bush was very thick, we sometimes did not see a sign of any inhabitants

for a distance of five miles. I frequently saw the male members of the tribe, and tried to get them to approach the caravan, but in vain, and occasionally I met a few old women who had remained in their villages while the caravan passed them, and once a dozen hunters came into camp to sell ivory. I bought a few ornaments and a beautifully tanned goat-skin apron from the women, which were very like the things in use among the Turkana. Except for the goat-skin apron worn by the women, the Mushas contented themselves with the same cleanly nakedness that was the fashion from the Boran to the Egyptians. The taller mountain ranges of this country are of volcanic origin, and in many cases their slopes are covered with abominable brecchiated rock, principally granite, while most of the flat-topped hills are composed of argillacious sandstone and shale. The surface of the valleys, which are for the most part covered with bush and forest, is composed of the richest alluvial soil underlaid with clay. To the south of our line of march the broad, yellow, grassy plains were considerably below 1700 feet from the sea-level. In a large valley at the outskirts of this country we remained a week to rest the camels, where a shower or two of rain had freshened up the foliage of the mimosa bushes. A day or two before we left, the natives living in the vicinity began to come to camp, finding that we did not disturb them; and if we had remained longer, no doubt we should have been on intimate terms with the whole tribe. They did not care to sell me any sheep, however, and for this and various other reasons connected with my outfit of men and camels, I thought it best to push on. While here we had the last of the autumn showers.

Since the changing climatic conditions of East Africa is now a subject of much importance, I must not omit to mention some of my meteorological observations. It is well known that the "karif," or fierce winds, that sweep the Somali coast in the summer months are a part of the northern trade winds. Now, these northerly winds persisted until we had got well beyond Lake Rudolf, and with them came a little rain. It was the autumn rains that are expected in Somaliland in September which first struck us in a sudden burst after we had left the Dawa river on October 13. These rains followed us all the way to our camp of January 13. They were very scanty, but it was curious that they should progress so from east to west. Half a dozen slight showers were all that any particular section of country received. The reason that Somaliland and the lowlands to the south of Abyssinia are so dry must be found in the drying effects of the Abyssinian highlands on the northern trade winds, the lofty mountain ranges condensing all the moisture in the air, and allowing only a pitiful drop or so to work south. All the rivers and lakes which came under my observation were half dried up—surely because there was a scanty rainfall this year in the Abyssinian highlands. The

secret can only be solved by a study of the changes that occurred in the northern trade winds. Hardly had we left our camp of January 13 before we began to see the natives preparing for a spring rain, and a spring rain dependent upon the monsoon winds from the south, which gives life to Uganda and most of the East African Protectorates. Thus we had arrived at a point where the autumn rains of one country, dependent on the northern trade winds, would have met the monsoon rains coming from Madagascar had not these been extremely late in arriving this year, as they were in reaching India. The famine which we found to spread all along the upper Nile was dependent upon the same conditions as the famine in India, and the very low condition of

CEDAR VALLEY.

the Nile at Cairo was caused both by the changes in the monsoon and also by the northern trade winds, since the Sobat rises in Abyssinia.

On January 21 we ascended a steep pass to a long narrow plateau, over 3000 feet above the sea, the game path which we took leading us along a beautiful clear-flowing brook shaded by tall cedar trees. The accompanying photograph shows a pool in "Cedar valley" near our camp at the top of the pass, in which a Gurkha is to be seen following my example in having a delicious cool plunge. The men I had sent ahead, and who had found the trail up Cedar valley, did not go far enough across the flat top of the ridge, and consequently did not discover that this ended abruptly in a sheer precipice on the other side.

Beyond, to the west and north-west, stretched a vast plain, as far as we could see. For a distance of about 30 miles the plain did not look so unattractive with its occasional little watercourses, fringed by many a pretty bit of green meadow or shady grove, but towards the horizon the monotonous greyish-white appearance of the surface looked very ominous. We spent three days on the top of the mountains in finding a game trail, and clearing this so that the camels could descend. Game was abundant, and it was in this country that I secured the specimens of the new gazelle, which I previously referred to, and also two varieties of buck, *Aurebia haggardi* and *Aurebia montana*.

At the foot of the hills we crossed at right angles the line of march of the late Captain Wellby. A couple of marches beyond this brought us to a large watercourse flowing west, where we found a new tribe of natives, the Magois. Noticing from the distance that the people were preparing for a fight and driving away their cattle, I pushed ahead with two boys, and persuaded them to desist from their hostile exhibitions. One stout young fellow in particular persisted for a long time in giving frequent leaps into the air to show that he would fight if called upon to do so, but this man proved afterwards to be as friendly and jolly as he was fat. He is shown in the accompanying photograph.

A MAGOIS YOUTH.

The Magois were distinctly different from any tribe previously met with on the journey in appearance and customs. They had the heavy build and large features, with high cheek-bones, of the Soudanese, and, above all, the lines of raised tattooing on their cheeks that is so typical of the people about the Nile. I believe that it is not unlikely that they are a branch of the Dinkas, who, perhaps, being driven from the Sobat by the Neurs, put the desert between themselves and their persecutors. They seem to care principally for small red beads, of which they had many already, some of them worked in gorgeous patterns on leather plaques, with which the warriors adorned their massive head-dresses. The most *outré* of our fashionable young men can never aspire to the height of collar worn by some of the Magois. With a collar of beads, which shoved their chin high up in the air, their locks done up in a great chignon, composed principally of clay covered with ostrich feathers, they looked the very pink of gay deceivers.

Parallel lines of raised tattooing on the chest and abdomen, leopards'

skins hung over the back, and a bell hung on a slender cord around the waist, helped to liven up the men's appearance. These are the only people whom I have ever seen wearing a zebra's tail suspended from the elbows. Many of the younger girls had rather attractive features and pretty figures, but I will not mention the appearance of the fair sex after they get to be twenty. The worst burden which they have to carry in life, however, seems to be the countless necklaces of beads which spread over their bosoms to the waist, and the large bracelets and anklets of ivory, brass, and iron. Their hair is shaved above the ears, and cut fairly close on the top of the head.

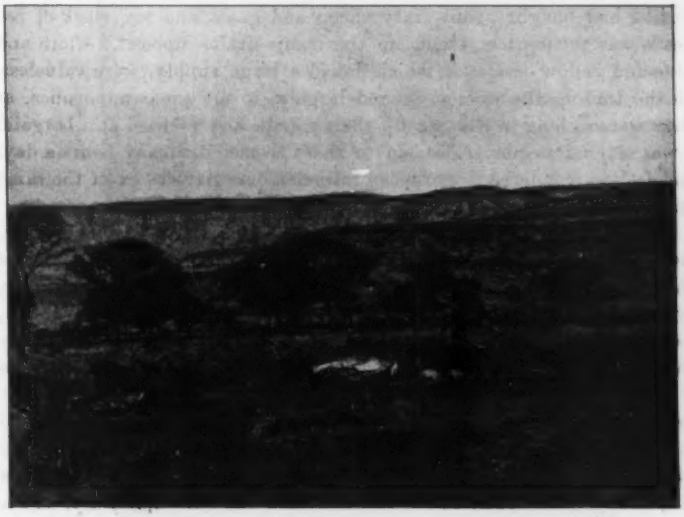
The Magois represented to us that if we went north-east again we would find a stream of water winding northward about the foot of the mountains into a bigger river a long way off, but I had no intention of going to the Sobat and thus leaving my work incompleted. Whenever I asked one of the natives about the plain to the west, he would draw his hand across his throat to represent that we must surely die if we attempted to march in that direction. However, we loaded up all our water-barrels and started on January 28 in a westerly direction, towards two mountains which loomed up on the plains. For a short distance the ground was firm, and we marched along swiftly, but then we came to the worst cotton soil I ever took men or beasts over. It was so loose that we sank in it up to our knees at one moment, while the next instant we stumbled in some crack hidden by a tuft of the coarsest yellow grass. The intense heat added to our burdens, so that we were glad to camp at the end of seven hours.

The next day's march was even worse than the first, and at the end of it I determined to stop and hunt for water about the two mountains, which were then near us. At the end of thirty hours the barren mountains and all the plain for many miles to the west had been scoured for water, but in vain. My animals had been nearly three days without food or water, so that there was nothing to do but to look disappointment in the face, and turn back to Magois. Two of my men found a stream, before reported by the natives, running north, where they told me there were many people and signs of cultivation. This was the stream I have since learned was followed by Captain Wellby to the Sobat. It starts in the mountains north-east of Magois, and not far away in the south.

Another of my scouts reported water directly east, and nearer the Magois, so in the afternoon of January 30 we started off in the direction indicated. My own Somali had been lying to me, since he had only seen what appeared to be a promising waterway, and took it for granted there was water in it without fully satisfying himself on the subject. Owing to this blunder we had one of the worst marches the next day that we experienced throughout the journey. From three o'clock in the morning until all hours the next night the wearied men and animals

plodded on in intense heat, and over the same terrible ground, to a pool of water which I finally found in the Magois river-bed, not far to the east of the Magois villages. At midday I distributed the last of the water we were carrying, which gave the men three pints each, not enough for many of the men, especially the Indians, but sufficient for Frazer and myself, although we had harder work to do than any of the escort.

At 5 o'clock, when I reached water, there were only a few boys and two camels loaded with empty water-barrels with me. These barrels were soon filled and sent back to revive the broken-down men, who were being taken care of by my assistant many miles behind; and then



NEAR MAGOIS.

came the hunting up of the camels and donkeys, which had been deserted by their camel-men, and which were roaming about in the dark among the bushes with all their loads on them. All the men we got safely into camp during the night or the following morning, but I never recovered from the loss which I sustained in transport animals. Some five camels died within the next two days, and as many more within a fortnight; five donkeys were lost, not one of my two dozen sheep and goats ever reached camp alive, and many boxes were injured. I was obliged to throw away much valuable kit. Besides this, the men became so disheartened that they never afterwards recovered from their apathy. Two days after this found us back again among our friends the Magois.

We determined now to follow the wady as far as we could, even though it took us a little south of west. Two short marches on February 5 and 6 brought us to a long pool of still water, but here the river-bed spread out in many little dried-up ditches, that lost themselves within a quarter of a mile in the plain. Here we found another branch of the Magois, who called themselves Katua, and represented that they were very independent of their immediate neighbours, and at war with a tribe called Toporan, living in the mountains west of Turkana. The Katua occupied a dozen large villages, and owned an immense number of cattle and other live stock. Although rich, they wore scarcely any ornaments, and did not care much for any other kind of beads than the wonderfully fashionable little red sim-sim. Trading went on merrily until I had bought about sixty sheep and goats, and my stock of red beads was getting low, owing to the many drains upon it. Cloth and blue and yellow beads, of which I had a large supply, were valueless. In the trading the women figured largely, to my great annoyance, as they were so long in making up their minds, and so hard at a bargain. I was obliged to play salesman to these women for many hours a day, and I often wondered if European salesmen ever have to exact the same amount of patience.

To my surprise, I discovered these people to be cow worshippers, and to indulge in certain rites which were supposed to be peculiar to the Hindoo religion. Plastering themselves with cow-dung, and throwing bits of dried *bois de vache* at every one and everything they liked, seemed to be a matter of much import to them, and occasionally some old man or woman would be quite unmerciful in giving me a too generous dusting. The origin of this cow worship is presumably the same with the Katua as with the Hindoo, traceable to the great dependence placed upon the animal for sustenance. The Katua eat the cow, but all their people turn out when the beast is killed, and go through much ceremony. They would not sell me a single cow.

We were again confronted by the waterless plain to the west, but to the south-west, however, rose a mountain range 40 miles away, that I thought must surely provide water, and thither I accordingly sent Ali Esa, whom I had made headman, and seven other Somalis with a week's supply of water and food to reconnoitre. I employed my time that was not given up to trading, in surveying and collecting and studying the natives, of whose language I made a short vocabulary.

Just here, for the first and only time on the journey, I found a number of Rüppel's reed-buck, the original *Cervicapra bohor*. This animal was first described by Rüppel nearly eighty years ago from a skull, probably brought down the Nile by traders, but it was not until the arrival of my complete specimens at the museum that all the characteristics of the animal were known. It stands 40 inches at the

shoulder, and is remarkable on account of its pretty light yellowish hair, and the peculiar forward bend of its horns.

The natives were very busy moving their villages to the hills in anticipation of the spring rain, and by the time my scouts returned, there was scarcely a soul left in the huts by the river. Ali Esa returned on February 12, and, to my great relief, reported water and people at the mountains before mentioned. We set out, therefore, once again across the abominable plain, and after four long marches arrived on

RAFFIA PALMS, COUNTRY OF THE AKARA.

February 15 at some wells situated among pretty hills, the most northern extension of the Uganda highlands. Far away to the south we got glimpses of great rocky masses, towering about 7000 to 8000 feet above the level of the sea. The friendly natives, who are called Akara and Dinka-Dings, did not understand a word of the Magois language, nor were they as heavily built or as black as the latter. Fairly tall and slender, with small features and moderate-sized noses, they resembled the Masai more than they did the Sudanese. They are again different to the Latuka, their immediate neighbours on the west.

Two more marches in a north-westerly direction took us across as many very broad dry river-beds, in which the groves of handsome raffia palms, with their ripe yellow fruit, made a great display. The country was very thickly populated by the Akara, who seemed delighted to have us come among them.

According to old maps of this region, which were founded entirely on native reports, several running rivers should have been crossed by us on our journey from Lake Rudolf, one large one running north into the Sobat, and several others running north-west into the Nile. However many streams may rise in the tall mountains to the south, the water disappears except in the rainy season as it approaches the ghastly plain, and even the sandy beds themselves are soon obliterated in this great desert of the Sobat. Mr. Frazer and I made side trips to all the most northerly hills of the Akara, in order to secure further bases for the triangulation to the west, and to trace the courses of the wadies, which finally disappear on the surface of the plain not far from Katua.

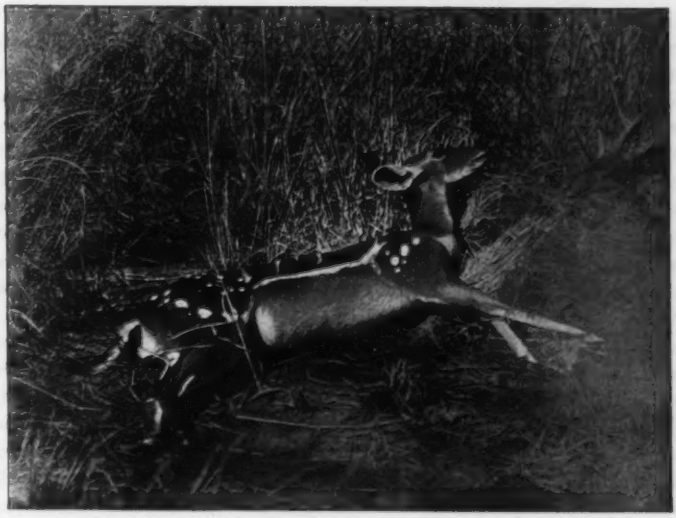
Keeping westwards across a broad valley, we came to many more of the Akara, who were agriculturalists as well as stock raisers, and had substantial large wooden dwellings with peaked roofs. Some of the villages which we passed could easily have contained fifteen hundred souls or more. Although friendly and eager to trade, the Akara were very annoying in not pointing out to us where water lay to the west of each camp. The wadies, which contained water in pools and wells, ran only from south to north, and I suppose the natives thought me excessively stupid in not following these river-beds instead of intersecting them at right angles, which involved long marches across hot plains and a hunt at the end for water.

Near our camp of February 21, in a large open forest, I shot a male and female spotted bush-buck (*Tragelaphus bor*, Heuglin), much to my delight, since they are the only specimens of this beautifully marked animal that have ever been secured.

On the 22nd we rounded the extreme northern end of one of the arms of the Dinka-Ding mountains, and camped near some villages at Lumin. A plain or valley similar to the one we had just crossed stretched before us to another arm of the southern highlands. We had some water difficulties crossing this plain, since my few remaining camels were loaded heavily enough without my burdening them with water. Some camel gave out almost every march, which necessitated my throwing away more and more loads. Although there was much to interest me, I cannot reflect on my journey from the time we reached the great desert of the Sobat until we arrived at the Nile with pleasure unalloyed, for shoving along a caravan of dying camels and would-be dead Indians, by the help of careless Somalis and a few tired though good Indians, for many weeks is a thing that one cannot forget. We were soon to meet more Sudanese tribes, the Latuka, together with the Okatela and Beri.

The Akara, Dinka-Dings, Turkana, Mushas, Mursu, and Murle seemed to belong to the Masai and to the aboriginal pigmies who live north of Lake Stefanie, and to have nothing in common with the Sudanese.

On February 27 we reached some pools of water on the plain, not far from the Okatela mountains, and the same afternoon my boys reported many natives to be watching us in a suspicious manner. Two of my Somalis, whom I had sent to the mountains in search of water for our next march, came back in the evening with strange tales of the natives trying to surround them and take them prisoners. They also



TRAGELAPHUS BOR (HEUGLIN).

reported very many large villages in the hills. I wished to pass around the northern end of the mountain range and proceed straight to Lado, but the reported attitude of the natives decided me on taking the southern route to Tarangole. Although there was but slight danger of not succeeding to come to friendly terms with the natives, I was particularly anxious just here to avoid any risk even of a fight, since I was near Tarangole, the most northerly point of Colonel Macdonald's expedition, where friendly arrangements had been entered into between the British Government and the native chief. Two marches brought us to Omin, a very large village near Tarangole, perched on a hill called Alanga at the foot of the mountain. During most of the morning's march crowds of natives, armed with spears and bows and arrows,

followed the caravan at some distance in an unfriendly manner. After a time, however, others more civilized from near Omin joined them, and these latter approached to within 100 yards and made friendly advances. The best course for me to pursue was to go over to these people without escort, and the result was even more than I expected. In a couple of minutes the natives were crowding round me, patting me on the back and grasping my hand in a rather annoyingly familiar manner, that showed plainly enough that they were greatly relieved to find that we were not a hostile party of Egyptians or Mahdists, from both of whom they had received many unwelcome visits since Sir Samuel Baker's time.

At Omin we found quite a number of blacks dressed in loose white cotton suits, such as are worn by Sudanese townspeople, or occasionally in Dervish "jibbas." Each man who wore any clothing carried some old musket or rifle, of which he was immensely proud, even though the weapon were useless. The people were all under the chief Amara of Tarangole and Loguren, who only allowed those who carried rifles to wear clothing, or who, in other words, gave to any bit of cloth the dignity of a uniform. Whenever a man laid aside his rifle he also disembarrassed himself of all clothing. There were strangers here from many Sudanese tribes, some of them deserters from the Khalifa's forces after the Belgians had destroyed the Dervish influence on the upper Nile.

It was an agreeable change to meet natives who had some knowledge of Europeans, and with whom we could converse through the medium of Arabic. The great strength of the people, however, lay in the magnificent physique, pluck, and skill in the use of the spear and bows and arrows of the proud young men who never knew the use of cloth, and who do not imagine that there is a power on earth equal to that of their king Amara. The one great ornament of these warriors is a heavy helmet made of brass plates, laid together on a frame of interwoven grasses. It has the appearance of a solid brass Crusader's casque, and when worn easily by jaunty and graceful warriors the effect is most striking.

We spent nearly two days at Omin, during which time I arranged for a rendezvous with chief Amara, at a village called Lorkale, some 6 miles north of his capital Loguren, and near Tarangole. Since I had now picked up many points of Colonel Macdonald's survey, and found them to have been relatively very correct, as were those of Major Austin at Rudolf, I dropped my triangulation after leaving Omin, and carried on my chartographical work to the Nile by means of a pocket compass and dead reckoning. I had wrongly judged that the country to the west of Tarangole had been thoroughly explored by Emin Pasha, Sir Samuel Baker, and by members of the Macdonald Expedition, but I find my map to be the only one giving any detail.

On March 2 a tramp of four hours west, principally through a highly cultivated country, brought us to Lorkale, where we were joined by King Amara in the afternoon. We were quite unprepared to receive so great a chief. Accustomed as we had been to meet with petty chiefs ruling generally but a single village, we were rather taken aback at the display made by this commander of perhaps 25,000 warriors on his visit to our camp. He was accompanied by a flag-bearer and about 200 soldiers with rifles, and clad in various kinds of uniforms, principally white with gay-coloured sashes and turbans, and by a much larger following of archers and lancers, naked except for their quick-flashing, bright helmets. Everything about Amara was "spick and span," from his dark blue uniform of a Uganda rifleman to the European saddle upon his mule.

I received him with all the honours that I could command with my insignificant though trained escort, for it was deemed a great honour that he should pay me the first visit. His curiosity as to how I had come was too great, however, for him to wait until I called on him. It took him a long time to grasp the fact that we had not wandered either from Uganda or Egypt; and from the many questions he asked, it was apparent that the fact that we had come directly from the far East exercised a great moral influence over him, which I was pleased to think could not be otherwise than for the good of European interests on the upper Nile.

In return for the many presents which I made him, he gave me much durrha flour, honey, and ground nuts, but it was not until I had bidden him accept a large leopardine blanket that covered my bed that his heart really warmed towards me. I am sure he has never owned anything which pleases him more than this rug, which resembles the skin of some marvellous species of the cat family. Not only did the king at once send for an escort and guides for us, but he insisted on having a large tusk brought me from his village, to my regret, for I am afraid a poor native had some of his bones broken in consequence, if he did not fare worse. This man had made a mistake, and instead of bringing the tusk the king had ordered, he arrived at midnight with two ridiculously small cow tusks. Amara was so enraged that, picking up one of the latter, he began beating the wretched messenger in a terrible manner.

The smiling chief had suddenly turned into such a ferocious brute that when I endeavoured to prevent his killing his subject, he at first turned upon me a pair of eyes so full of passion that I feared lest he might deal his next blow at me, but I pretended that I had only interrupted him to praise the two small tusks, with which "I would be delighted," etc., and thus managed to quiet him. The unconscious body of his victim was almost hurled out of camp, and others sent to bring the proper tusk, which did not arrive until two o'clock in the morning.

Amara was a splendid specimen of a Sudanese, over 6 feet in height, very broad and muscular, and with a strong, handsome face. But for his outburst of passion, which lasted but a minute, I should have thought him most cheerful and amiable.

Two long marches on March 3 and 4 brought us to a village where we were visited by a lady chieftain. I followed out my custom of offering a chair to a recognized chief, but I must confess the position was rather strange to me to be sitting with a well-formed young lady clad in the same manner only as Gunga Din, and talking over weighty affairs involving the welfare of her subjects with the latter. Her name was Kari, but she behaved herself in such a dignified manner as to preclude any idea that she would have recognized a name such as Caroline. The day after this we reached the village of the chief Uri Sube, the last of the villages under King Amara. From here on until we reached Loker we found ourselves in territory belonging to the Lukoyu, who inhabit principally the hills to the south, and possess but a few scattered hamlets in the bushy, wild plain through which we passed. We had much difficulty in cutting our way through the low forests and dense bush, occasionally getting tangled up in bamboo jungles, which we here encountered for the first time.

I heard from Amara that there was an Englishman stationed on the east bank of the Nile considerably south of Lado, so I abandoned my intention of going to the Belgians on account of the pleasure I felt it would give me to talk once more to an English officer, not dreaming that I could not enjoy the same benefit in the Uganda Protectorate that all civilized countries extend to visitors—that of being able to leave my valuables in bond at a frontier post, if I did not intend to enter them in the country. I firmly anticipated finding the Nile open, so that I could take my outfit to Cairo either in steamers or canoes. The first great disappointment came at Loker's, a large settlement situated almost on top of the long mountain which can be seen from the Nile 25 miles east of Fort Berkeley or Rejaf. On reaching here on March 10 we were informed that no steamers had come up the Nile, and that, furthermore, there were no canoes to be had. We were all cut up by the news, for my transport had already given out, and I was obliged to leave thirteen loads with the chief Loker to hold until I sent back for them. However, we reached Fort Berkeley on March 14, 1900, and although I was much pained at the extortions which were enforced upon me by the Government, according to Uganda Protectorate regulations, I shall never regret having touched an English outpost, from the simple fact that I met Captain Wm. K. Dugmore of the Uganda Rifles, and remained with him as his guest for nearly seven weeks.

I only wish I could look upon some other officials with whom I came in contact at Aden and Berbera with nearly the same respect as I do my good friend and hospitable host at Fort Berkeley. Learning from

despatches to Captain Dugmore, three months old, that "sudd" cutting had been begun on the Nile, I kept my men for nearly a month at the post, hoping that a steamer would come up the river and take us out *viâ* Omdurman. But on April 13, I found it necessary to send Mr. Frazer with all my men to Mombasa, except my cook and my bright Gurkha orderly, Hasap Singh. Famine was raging throughout the upper Nile districts, and had it not been for the great kindness of the Belgians in giving me grain, I could not have kept my men at all. I was obliged to remain longer myself, since I could get no transport for my collections and kit; and I had just made arrangements with the Belgians to go down

THE NILE AT FORT BERKELEY.

the Congo, a journey of four months in the rains, to the west coast, when, to my joy, Major Peake turned up in a gunboat, after having cut through the "sudd," and most kindly took me away with him on May 5, on his homeward journey of 1100 miles to Omdurman.

I reached Cairo the beginning of June, just ten months from the time of starting from the Somali coast for the interior, and a fortnight later found me in London with my collections safely installed at the British Museum of Natural History, to which I am presenting the most valuable of my specimens. The Academy of Natural Sciences of Philadelphia will also receive a large share. The collections include several hundred different species of birds, mammalia, plants, reptilia and batrachia, fishes, butterflies, etc.—a good number of them new to science.

I am much indebted to the Indian Survey Department for the loan of a valuable set of surveying instruments, by which I was enabled to lay down in detail over 500 miles of previously unmapped country between occasional known lines.

Before the reading of the paper, the President gave his introductory address (see p. 597). After the paper—

Major R. G. T. Bright said: I have listened with very much interest to Dr. Donaldson Smith's paper. It is, perhaps, doubly interesting to one who has had the good fortune to pass over much of the country which he has traversed. Judging from the amount of water which Major Austin and I found in the country south of the Sobat, when at the beginning of this year we tried to make a journey to Lake Rudolf, I am inclined to agree with Dr. Donaldson Smith in his surmise that at one time the Nile, the Sobat river, and Lake Rudolf were one vast inland sea. In 1898 I was at the north of Lake Rudolf with one of the columns of Colonel Macdonald's expedition; there were then a few wretched natives, where, but a short time before, there had been a very rich and prosperous community. These natives at the time were suffering from famine, and an epidemic of small-pox. I am, therefore, not surprised to hear that now there are but few inhabitants in that part. This is due to the so-called civilizing raids of the Abyssinians. Dr. Donaldson Smith will, I am sure, not rest long. He has already led several expeditions to a successful issue, and I wish him, as in the present case, safe and many happy returns.

Dr. Bowdler Sharpe: Dr. Donaldson Smith has on his former, as on his present expedition, greatly benefited zoological science, and his discoveries are quite on a par with the wonderful new facts which he has brought from the countries through which he has been. You have heard from the paper that we have at the Natural History Museum five new specimens of mammalia. I have not quite finished the birds, but there are certainly some new species, and many of great interest, especially from that new part of Africa which has not been visited by a naturalist before. I need hardly say that the British Museum thanks him on this occasion, as it has on former occasions, for not having forgotten zoological science. He has presented us with those specimens which we before had not in the Museum.

The President: Dr. Donaldson Smith's paper is certainly one of peculiar interest, even apart from his description of a new and almost entirely undiscovered region. I was particularly struck by the remarks (very important remarks, I think) he made respecting the meteorology of this country. The desert lands, especially to the eastward, are caused by the winds from the north blowing over the mountains of Abyssinia, and being thus wrung perfectly dry, coming down on their southern sides as dry winds. This no doubt accounts for many phenomena connected with the regions south of Abyssinia; but it requires a great deal more careful study, and this is a point of some importance, as the country will hereafter become a British settlement. Possibly connected with this question is the very remarkable fact that the whole fauna, both birds and mammals, appears to change as soon as Lake Rudolf is passed. There is a different fauna on the eastern to that on the western side. In considering the paper of Dr. Donaldson Smith, all these points give rise to reflection; but we get very little idea of the important geographical work he has done from simply listening to his paper, even when taken in conjunction with the paper he read to us a few years ago. He has not only explored a new region, but has done so with the greatest care; and has made a

most valuable series of surveys by triangulation. He produced on his first journey a number of extremely valuable maps, and will, I have no doubt, do the same with regard to his latest journey. He has also made, as Dr. Bowdler Sharpe told us, a most important collection of specimens of mammals and birds, as well as of batrachians and other lower forms. All this, I think, places Dr. Donaldson Smith in a very high position as an explorer of unknown countries, and I think that he deserves the highest praise that can be bestowed on him by geographers. I now propose a very cordial vote of thanks to Dr. Donaldson Smith, which I feel sure will be carried unanimously.

Note on Dr. Donaldson Smith's Map.—Heights determined by many boiling points, as well as aneroid observations. As far as Lake Stefanie the positions were determined by triangulations based on points fixed by me in 1895, aided by frequent astronomical observations with theodolite, three chronometers, and sextant. Between Lake Rudolf and Tarangole I depended upon triangulation almost entirely, aided by occasional astronomical observations for latitude. The base for this was plotted in the vicinity of the northern end of the lake from my previous observations, from a new set of measurements, and from points laid down by Major Austin.—A. D. S.

THE VOYAGES OF DIOGO CÃO AND BARTHOLOMEU DIAS, 1482–88.*

By E. G. RAVENSTEIN.

When Prince John, on August 26, 1481, and at the age of twenty-six, ascended the throne of his father Affonso, he found the royal treasury empty, and his ambitious nobles, jealous of their feudal privileges, ever ready to defy the authority of their king. But John was strong and energetic where his father had been weak and vacillating, cautious where he had been rash and regardless of consequences. Wise measures of administration once more filled the royal coffers, and a strong hand crushed the nascent conspiracy of the nobles.

The Guinea coast by this time had been explored as far as Cape S. Catharina. Lopo Gonçalves had been the first to cross the line; Fernão Po is credited with having discovered the Ilha Formosa, which now bears his name, in 1472; whilst Ruy de Sequeira, "about the same time," according to Galvão,† followed the coast as far as Cabo de S. Catharina (November 25), and also discovered the islands of S. Thomé (December 21) and S. Antonio (January 17).‡ This last subsequently

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* The substance of this paper was communicated at the Toronto Meeting of the British Association in 1897. For a notice of the maps referred to, see the Appendix. Maps, p. 712.

† Antonio Galvão (b. 1503, d. 1557), 'The Discoveries of the World' (1555, London; Hakluyt Soc., 1862), p. 75.

‡ Faria e Sousa ('Asia Portuguesa' (Lisbon, 1675), i. p. 18; iii. p. 529) credits João de Santarem with having explored the coast as far as Cabo de S. Catharina in 1471—a most unlikely thing to have happened. Lopez de Lima ('Ensaios sobre a

became known as Ilha do Principe, that is the island of Prince John, the future King John II., who had enjoyed the revenues of the Guinea trade ever since 1473.*

The Guinea trade by this time had become of importance, but since the termination in 1475 of the monopoly granted to Diogo Gomes nothing had been done to expand it; nor had steps been taken to render effective the claims to sovereignty put forth by Portugal. Hence foreign interlopers made their appearance on the coast, and during the unfortunate wars with Castile (1475–80) entire fleets sailed from Spanish ports to share in the profits of the trade there.

One of the first measures taken by King John was to put a stop to these irregularities. Royal ships were sent out to protect Portuguese interests, and on January 20, 1482, Diogo d'Azambuja † laid the foundations of the famous Castello de S. Jorge da Mina, which was the first European settlement on the Gold Coast, and the centre of Portuguese activity up to 1637, when it was captured by the Dutch.

The First Voyage of Diogo Cão, 1482–84.

When King John had thus attended to what he conceived to be his more immediate duty as a king and ruler, he took up the long-neglected work of his uncle Henry, for he was both "a good Catholic, anxious for the propagation of the faith, and a man of an inquiring spirit, desirous of investigating the secrets of nature." ‡

Diogo Cão, whom the king selected to initiate this work of exploration, was a "man of the people." Genealogists have provided him with a noble pedigree, but he was in truth the descendant of one Pedro Affonso Cão, or Cam, who, in the days of King Diniz (1279–1324), had been one of the bailiffs of Villa Real in Traz os Montes, and of his wife, Briolanja da Nobrega. § In the patent of nobility of 1484, ‖ by which the king "separated him from the common herd," the past services of

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Statistica das Possessões Portuguezas' (Lisbon, 1844), ii. p. v.) makes him at the same time the discoverer of the Guinea islands, including Annobom, or New Year's island. This island, however, was only discovered at a much later period, and independently of the other islands, for it is absent from Soligo's chart (1485), and is shown on early charts as lying to the south or even south-east of St. Thomé, when it really lies to the south-west. The island was no doubt discovered by a ship attempting a "short cut" across the Guinea gulf, and carried upon it by the equatorial current. If Duarte Pacheco Pereira (b. 1450, d. 1533) ('Esmeraldo de situ orbis,' p. 78) tells us that S. Thomé and S. Antonio were "discovered" by King John, we may be permitted to assume that this "discovery" took place when King John was still heir-apparent.

* For documents proving this, see 'Annaes mar. e col.,' v., 1845, p. 38.

† Luciano Cordeiro, 'Diogo d'Azambuja.' Lisbon, 1892.

‡ Ruy de Pina, 'Chronica d'El-Rei D. João II.' (Lisbôa, 1792), ii. t. 57, p. 144. (Ruy de Pina and Garcia de Resende were cavaliers of King John's household.)

§ See Sisera de Sanches de Baena (*Boletim Lisbon Geogr. Soc.*, 1886, p. 55) and Luciano Cordeiro (*ib.*, 1892, p. 109).

‖ See this patent in full in L. Cordeiro's 'Diogo Cão' (1892), p. 75.

the recipient of the honour are referred to, and also those of his valiant father, Badalhouce, and of his grandfather, Gonçalo Cão, who may have fought in the famous battle of Aljubarrota (1385), when the Castillian pretender was routed, and the king, duly elected by the Cortes, got his own. Among the services rendered by Diogo Cão himself may be instanced the capture of three Spanish vessels on the Guinea coast in 1480.*

We do not know whether Cão was given the command of one or of more vessels, nor have the names of any of his officers been placed on record. But when we turn to ancient maps, we meet with a Rio do Infante, a Golfo de Alvaro Martins, a Cabo de Pero Dias, a Rio de Fernão Vaz, an Angra de João de Lisbõa, an Angra de Ruy Pires, and a Serra de Corte Real. There can be no reasonable doubt that the names attached to these bays, capes, or rivers are those of persons who were with one or more of the expeditions engaged in the discovery of these coasts. Of João Infante, Alvaro Martins, and Pero Dias, we know that they were with Dias, and may previously have been with Cão. João de Lisbõa won great distinction in the course of time, and in 1525 was appointed Piloto mór of India. Unfortunately, he died the year after.† Fernão Vaz may have been the pilot who, in 1486, witnessed the agreement between Fernão Dulmo and João Affonso do Estreito about the search for the Sette citades; who got into disgrace for poisoning his wife, and was himself poisoned by his mistress in 1502.‡ The name of Côrte Real we find on Behaim's globe only, and as the Côrte Reaes of Terçeira were a family of seamen, it is quite possible that a member of it may have joined one of these expeditions, perhaps Gaspar, the alleged discoverer of "terra nova." It is, however, quite possible that Behaim merely intended to pay a compliment to a family with whom he was distantly related.§ Of Ruy Pires we know nothing.

Cão was the first to carry "padrões," or pillars of stone,‖ on an exploring voyage. Up to his time the Portuguese had been content to erect perishable wooden crosses, or to carve inscriptions into trees, to mark the progress of their discoveries. King John conceived the happy idea of introducing stone pillars, surmounted by a cross, and bearing, in

* For an account of this capture by Eustache de la Fosse of Doornick, who was in one of the Spanish vessels, see Duro (*Bol. Geogr. Soc. of Madrid*, 1897, pp. 193–195).

† Sousa Viterbo, 'Trab. naut. dos Port.,' i. pp. 187, 255.

‡ Sousa Viterbo, *loc. cit.*, p. 304.

§ Behaim's brother-in-law, Jobst Hürter, junr., married the youngest daughter of Fernão Vaz de Côrte Real. See E. do Canto, 'Os Corte-Reaes' (Ponta Delgada, 1883), p. 23.

‖ On these padrões see two 'Memorias,' by A. Magno de Castilho (Lisbon, 1869 and 1871), and Luciano Cordeiro, "Diogo Cão" (*Boletim Lisbon Geogr. Soc.*, 1892).

addition to the royal arms, an inscription recording in Portuguese, and sometimes also in Latin, the date, the name of the king by whose order the voyage was made, and the name of the commander. The four padrões set up by Cão on his two voyages have been discovered *in situ*, and the inscription upon two of them (one for each voyage) are still legible, notwithstanding the lapse of four centuries, and have been deciphered.

During the first voyage two padrões were set up—one at the Congo mouth, the other on the *Cabo do Lobo* in lat. 13° 26′ S., now known as Cape St. Mary. The latter has been recovered intact. It consists of a shaft 1·69 m. high and 0·73 m. in circumference, surmounted by a cube 0·47 m. in height and 0·33 m. in breadth. Shaft and cube are cut out of a single block of lioz, a kind of limestone or coarse marble common in the environs of Lisbon. The cross has disappeared, with the exception of a stump, from which it is seen that it also was of stone, and fixed by means of lead.

THE ARMS OF PORTUGAL UP TO 1485.

The arms of Portugal carved upon the face of the cube are those in use up to 1485, in which year João II., being then at Beja, caused the green cross of the Order of Avis, which had been improperly introduced by his grandfather, who had been master of that order, to be withdrawn and the position of the quinas, or five escutcheons, to be changed.*

The inscription covers the three other sides of the cube. It is in Gothic letters and in Portuguese, and reads as follows: "In the year 6681 of the World, and in that of 1482 since the birth of our Lord Jesus Christ, the most serene, most excellent and potent prince, King D. João II. of Portugal did order (*mandou*) this land to be discovered and these padrões to be set up by Dº Cão, an esquire (*escudeiro*) of his household." There is no inscription in Latin.

As the year 6681 of Eusebius begins on September 1, 1481, we gather from this inscription that the order for the expedition was given between January and August, 1482. Of course the departure may have been delayed, but the delay cannot have been a long one, as Cão was home again before April, 1484.

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* See Ruy de Pina, 'Chronica d'El-Rei D. João II.' (Lisbon, 1792), p. 64; Garcia de Resende, 'Chronica' (Lisbon, 1752), p. 27. The exact date when the change was made is not given, and Sr. José Bastos, the learned keeper of the Torre do Tombo, informs me that there are no documents in his charge which would enable him to settle the point. The change was obviously made prior to the introduction of the new coinage in June.

Further light is thrown upon Cão's first voyage by a chart of Cristoforo Soligo, evidently drawn immediately after his return, a notice of which we give in the Appendix. Apart from this, we are dependent upon João de Barros and the chroniclers Ruy de Pina and Garcia de Resende.*

Cão may thus be supposed to have left Lisbon about the middle of 1482—say in June. He called at S. Jorge da Mina for supplies, and then made straight for Cabo de Lopo Gonçalves. His progress south along this coast was necessarily slow, for the current sets to the northward, the winds are southerly, and the surf is heavy. Only on rare occasion is the mariner favoured with a current setting to the south. He is dependent, therefore, for his progress upon a judicious use of land and sea-breezes. Leaving behind him the Cabo de S. Catharina, with its "tree" marking the furthest point reached by the seamen employed by Fernão Gomez, the Cape of Pedro Dias,† and the wooded hills of the Holy Spirit, Cão seems to have made a first stay in a bay merely described as "Angra" on Soligo's chart, but named Gulf of Alvaro Martins on others, and now known as Mayumba bay. He then left behind him a country of heavy rains and most luxuriant vegetation, and entered upon a region occasionally actually arid. Passing beneath the Paps of Bamba (*os duos montes*), and along a coast for the most part cliff-bound, he entered the Bay of Loango, which must have taken his fancy, for he called it *Praia Formosa de S. Domingos*. It is possible that he arrived here on that saint's day, that is on August 4. Passing thence to the south, and along fine red cliffs (*barreiras vermelhas*), Cão become soon aware that he was approaching a large river, for when still 5 leagues out at sea—as a legend on Soligo's chart tells us—he found the water fresh—by no means an exaggeration, for islands of floating vegetation coming out of the Congo have been encountered 100 miles from its mouth, and 9 miles to seaward the surface water is quite fresh.‡

Great must have been the astonishment—nay, terror—of the natives when for the first time they saw rising above the horizon the sails of a white man's vessel, and beheld the bleached faces of its inmates. Cão sailed up the river § for a short distance, and at once entered into friendly relations

* According to Ruy de Pina, Cão's first voyage was undertaken in 1485–86; according to Barros ('Da Asia,' Dec. I., liv. iii. c. 3), in 1484–86. Both suppose Cão to have gone no further south than the Congo.

† Corrupted into Pedras point.

‡ 'Africa Pilot,' Part ii. (London, 1893), p. 154.

§ The Congo seems at first to have become known as Rio do Padrão, and river of the Mani Congo; but Duarte Pacheco already knows one of its native names, Nzadi, though in the corrupted form of Emzaze.

with the natives. Physically, they resembled the negroes of Guinea, but the interpreters whom Cão had with him failed to make themselves understood. The natives came freely on board to barter cloth in exchange for ivory, and gave their visitors to understand by signs that far in the interior there lived a powerful king. Cão at once despatched some Christian negroes to this king as his ambassadors. They were, as a matter of course, the bearers of suitable presents,* and were instructed to assure the king of the friendly intentions of his visitors from Portugal, and of their desire to trade. The native guides promised to bring these messengers back within a certain number of days.

Before leaving the Congo for the south, Cão set up the first of his padrões, emphatically called "the first" on Canerio's chart. It stood on Shark point (and not on Padron point of our chart), and was dedicated to S. Jorge, a saint for whom King John felt a "singular devotion." We learn from Fathers Cavazzi and Merolla† that the Dutch, when they occupied the Congo in 1642, wantonly destroyed this memorial of Portuguese enterprise. Merolla, who saw the fragments in 1682, was able to trace the royal arms and an inscription, of which unfortunately he made no copy. A tall wooden cross was subsequently erected on the spot where the pillar stood, and an oratory built near it where masses might be said.‡

THE PADRÃO OF SÃO JORGE.

The fragments of the padrão were appropriated by native priests, who looked upon them as most potent fetishes. Sr. Sori saw them in 1859;§ Burton visited the locality in 1863;‖ and Baron Schwerin, guided by Sr. F. J. de França, did so in April, 1887. The baron caused the bandages in which the fragments were wrapped up to be removed, in honour of which event the *Massebi*, a Portuguese gunboat, fired a salute.

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* The damask petticoat which the king wore when he received Ruy de Sousa in 1491 is said to have been given him by Cão (Barros, 'Asia,' t. I. i. p. 231).

† Cavazzi, 'Istorica descrizione de tre' regni Congo,' etc. (Bologna, 1687), p. 319; Merolla, 'Relatione del viaggio nel regno di Congo' (Napoli, 1692).

‡ This plain statement disposes of the absurd story told by the Portuguese in 1859, according to which the padrão was broken by cannon-balls fired from an English ship, and that its fragments would have found their way to the British Museum had not the boat in which they were being conveyed on board capsized. (L. Cordeiro, *Boletim Lisbon Geogr. Soc.*, 1892, p. 152; and *Transactions South African Philos. Soc.*, 1898, p. 298.)

§ Sr. Sori's 'Descobrimentos dos Portuguezes nos Seculos, xv. e xvi.,' we were unable to obtain, and we take this information, together with our illustration, from Castilho's 'Os Padrões' (Lisbon, 1869), p. 17.

‖ Burton, 'Two Trips to Gorilla Land' (London, 1876), i. p. 59.

Mr. Dennett * examined the fragments in May of the same year. There were two large pieces, as shown in our illustration, and two ball-shaped pieces, 7 and 9 inches in diameter, lying at their foot. The material was a coarse white marble. The two larger fragments are now in the museum of the Lisbon Geographical Society.

The very hideous monument set up in 1859 by Sr. Sori was fortunately washed away by the sea in 1864. It was replaced, in 1892, by a memorial of better design, but still vastly inferior to the original padrão.

It is to be presumed that Cão, when, after a delay which may well have extended over several months, left for the south, was able to gain a fairly complete knowledge of the coast, for his progress must have been slow. We know from Soligo's chart that he discovered a river, which he named after Fernão Vaz,† as also the low sandy Ilhas das Cabras (Goat islands), off the modern city of Loanda.

Making a long stretch from the coast, Cão never noticed the most important river along the coast, the Kwanza, although its clayey waters discolour the sea for 10 or 15 miles. It is curious that none of his immediate successors should have been more fortunate. The river is not mentioned in Pacheco's 'Esmeraldo,' and is apparently shown for the first time on a chart of P. Reinel, who already knew its native name.

A remarkable headland, which from some bearings appears as a double peak, was appropriately named by Cão, "A terra da duas Pontas." It is now known as the "Morro," or hill, of Old Benguella. Further south, Cão seems to have examined the mouth of the Catumbela, for Rio do Paul—river of the swamp—is a very appropriate name for a river which, after the rains in March and April, overflows its banks and converts a great extent of country into a swamp or marsh. As Cão called the bay to the south Angra de St. Maria, he may have been in the vicinity of this river on Lady Day, March 25, 1483.

The bold granitic cliffs immediately to the south of Ponta Choca (13° 17′ S.) became known as Castello d'Alter pedroso;‡ and about 10 miles beyond, on a low point, which he called "Cabo do lobo" (seal point), Cão erected his second padrão, which was dedicated to St. Augustin, from which it must not be inferred that it was erected on August 28, as these dedications were made in Portugal. At the back of this cape, now known as St. Mary (13° 26′ S.), rose a Monte negro (black mountain), and Pacheco § tells us that it was called Ponta negra, or Preta (both meaning black point), because of a "black" trump, "manilha negra," which was played here in a game of manille. This

* Dennett, *Jour. Manchester Geogr. Soc.*, iii., 1887, p. 122.

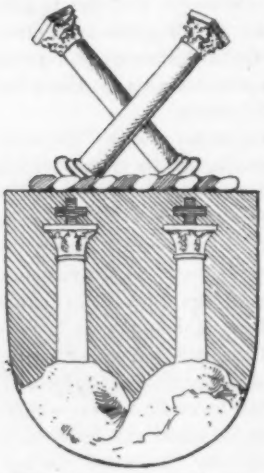
† The river Dande. It is shown on Soligo's chart.

‡ Alter pedroso is a village near Portugalete, belonging to the Order of S. Bento; Diogo d'Azambuja was commander of this village ('Esmeraldo,' p. 68).

§ 'Esmeraldo,' p. 85.

padrão has already been described by us. It was the second and last set up during this voyage, and Soligo's chart correctly describes it as "o ultimo padrão."

When Cão returned to the Congo, he was annoyed to find that the messengers whom he had despatched to the king had not yet returned, although they had been absent double the time expected. Cão, who was naturally anxious to return home with a report of his discovery of what seemed a powerful kingdom, therefore seized four native visitors to his ship as hostages, giving their friends * to understand that after the lapse of fifteen months he would bring them back and exchange them for his own men, who were still with the king. These latter, we learn from Ruy de Pina, had been made much of; but when the king heard of Cão's high-handed proceedings, he refused to admit them any longer to his presence, and threatened to kill them, should his own people not be restored in time.



THE COAT-OF-ARMS OF D. CÃO, 1484.

Among Cão's hostages was one Caçuto, a "nobleman" in his own country, and a man of some intelligence, who seems to have picked up Portuguese rapidly. King John was much pleased with this man, and the information which he was able to give. He, as well as his companions, were treated with much distinction, and dressed in fine cloth and silk!

Cão came back to Lisbon probably in the beginning of 1484, and certainly before April of that year. The king, first of all, made him a "cavalleiro" of his household. He then, on April 8, 1484, "in consideration of the services rendered in the course of a voyage of discovery to Guinea, from which he had now returned," granted him an annuity of ten thousand reals, to be continued to one surviving son; and a few days afterwards, on April 14, he separated his "cavalier" from the common herd and made him noble, and gave him a coat-of-arms charged with the two padrões which he had erected on the coast of Africa.†

* Garcia de Resende, 'Chronica,' c. 155, p. 68, says "certain months;" but Ruy de Pina, 'Chronica,' c. 56, p. 146, and Barros, 'Da Asia' (Lisbon, 1778), t. I. i. p. 174, say fifteen months.

† These documents, which prove absolutely that Cão was back from his first voyage before April 1, 1484, were first published by Albano da Silveira in 'Annaes mar. e col,' v., 1845, p. 37. L. Cordeiro republished them in the *Boletim*, 1892, p. 159.

Coat-of-arms: Field *vert*, charged with two columns *argent*, each rising upon a

The Second Voyage of Diogo Cão, 1485–6.

The materials for writing a history of Cão's second expedition are even less complete than those available for the first. There are the padrão of Cape Cross with its inscription, an important legend on the chart of Martellus Germanus, and the narrative of Martin Behaim, who claims to have commanded one of the vessels. Apart from these, we are dependent upon the accounts given by Ruy de Pina and João de Barros, for none of the later historians seem to have had access to original sources.

The narrative of Behaim, as gathered from the legends on his famous globe, and a paragraph in Schedel's 'Liber Chronicorum,' printed at Nürnberg in 1493, during Behaim's presence in that town, is as follows :—

In 1484 King John sent two vessels to the south, one being commanded by D. Cão, the other by Martin Behaim. They carried, in addition to goods for barter, eighteen horses with splendid harness, intended as presents for Moorish (*i.e.* Negro) kings. They traded with the Jolof and on the Gambia; visited King Furfur's land,* 1200 German leagues from Lisbon, where the Portugal pepper grows, and came to a country where they found cinnamon. They also discovered Prince's island, S. Thomé and Martin (Behaim's!) islands (*i.e.* Annobom). On January 18 they set up a column on Monte Negro (Cão's third pillar in 15° 40′). Having sailed 2300 leagues, they set up another pillar on Cape Ledo.† They were again with their king after an absence of 19 (16 or 26) months,‡ having lost many men from the heat, and bringing pepper, grains of paradise, and many other things in proof of the discoveries they had made.

We have elsewhere § considered the trust-worthiness of this account of Cão's expedition, and arrived at the opinion that Behaim did not accompany Cão, but may have been on the Guinea coast with an expedition such as that of João Affonso d'Aveiro.

Far more useful for our purpose is the pillar which formerly stood

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hillock, and surmounted by a cross *azure*. Crest: the two columns crossed and tied with a ribbon *vert*. Our illustration is taken from the 'Thesouro de Nobreza,' of Francisco Coelho, 1575, as published by Luciano Cordeiro.

* King Furfur's land is clearly Benin, whence d'Aveiro, in 1486, brought the first Guinea pepper to Portugal. Behaim's cinnamon must have grown in Ptolemy's apocryphal Cinnamoniphera Regio.

† 2300 leagues on Behaim's globe actually carry us to a Cape Ledo, which critics may be forgiven for identifying with Dias' furthest.

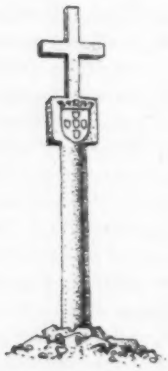
‡ Nineteen months on the globe, 16 in the German, 26 in the Latin version of the chronicle.

§ Ravenstein, 'Martim de Bohemia' (Lisbon (Ferin), 1900), pp. 25–35.

on Cape Cross, and which Captain Becker of the *Falke* carried off to Kiel * in 1893. Dr. Scheppig has fully described the pillar.†

The shaft is 1·84 m. long, and has a circumference at the bottom of 0·93 m. It tapers slightly towards the top, and is surmounted by a cube 0·43 m. high, 0·45 m. broad, and 0·26 m. thick. The whole is hewn out of a single block of marble. The cross, also of marble, was fixed by means of lead. The arms carved on the face of the cube are those adopted by John II. in 1485. There are two inscriptions in Gothic characters, the one in Portuguese, the other in Latin. The Portuguese inscription says—

"In the year bjMbjclxxxb (6685) of the creation of the world, and



THE PADRÃO OF CAPE CROSS.

THE ROYAL COAT-OF-ARMS, 1485.

of Christ lllldxxxb (485), the excellent, illustrious King D. João II. of Portugal did direct this land to be discovered, and this padrão to be set up by Dº Cão, a cavalleiro (knight) of his household."

The Latin inscription reads as follows:—

"There had elapsed 6684 (5?) years since the creation of the world, and 148– since the birth of Christ, when the most excellent and most serene King, D. João II. of Portugal . . . ordered this column to be set up by his knight (*militem*) Iacobus Canus (*i.e.* Diogo Cão)."

Dr. Scheppig observes that the dates in this Latin inscription are both written in Arabic characters, "which, owing to their novel form, were still sources of frequent error and confusion," and that the fourth

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* The German Emperor has since caused an exact copy of it to be erected, substituting granite for marble.

† *Annalen der Hydrographie*, 1893, p. 190; *Marine Rundschau*, 1894; *Times* December 27 and 31, 1894; and L. Cordeiro, "O ultimo Padrão de Diogo Cão" (*Boletim*, 1895, p. 885).

cipher in 6684 is certainly of abnormal shape, and may perhaps be meant for a 5, in which case both inscriptions would agree. As to "1485" no doubt whatever arises.

As the year 6685 of the Eusebian era begins on September 1, 1485, Cão must have departed after that day, and before the close of the year. As he had returned from his first voyage before April, 1484, his departure must have been delayed for reasons not known to us. Perhaps it was owing to the opposition of the Royal Councillors to further expeditions, perhaps a desire that the contemplated change of arms might be recorded on the padrões to be sent with the explorer.

During this voyage Cão seems to have commanded a fleet—at least, so we are told by Ruy de Pina, Garcia de Resende, and Martellus Germanus. He took with him, as a matter of course, the four men whom he had so unceremoniously carried off. These had been well treated in Portugal, and were the bearers of rich presents to their king, whom they were to invite to throw aside his idols and fetishes and embrace the only saving faith.*

It may be presumed that Cão, in the course of this second voyage, gained a fuller knowledge of the coast first discovered by him to the north of the Congo. He may thus have visited and named the bay called *Golfo do Judeu*, the Jews' bay, of old maps, either because there was a Jew on board his vessel, or, what is less likely, because he was struck with the Jewish physiognomy of some of the natives, who are absurdly supposed to keep the Jewish sabbath, when in reality they have fetishes and *Casas da tinta* like their neighbours.† He may also have entered the fine *Golfo das almadias* (Kabinda bay), still famous for its boats, as it appears to have been in the days of the early Portuguese.

There was great rejoicing when Cão entered the Congo, and it became known that the hostages whom he had carried off were on board his ship. He at once sent one of these men to the Mani Congo, to announce his arrival, and to beg that his own people should be sent down to the coast, when the other three would be released. When the man came back, Cão sent a present to the king, and let him know that he was about to follow the coast to the south, but that on his return he would seek speech with him, and hand over the presents with which he had been entrusted.‡

Passing southward along the coast, Cão landed several times for the

* I. da Costa Quintilla, 'Annaes da Marinha Portuguesa,' i. p. 197, says that the king sent an "ambassador" to the King of Congo, but Ruy de Pina (p. 147) and Garcia de Resende (p. 68) only say that he sent a "message" (*embaizada*) by these four men.

† Makoya, near Chinchosho, is one of the principal villages of these supposed Jews. See Bastian, 'Deutsche Expedition nach der Loangoküste,' ii. pp. 45, 275.

‡ All this according to Barros, Dec. I., liv. iii. c. 3.

purpose of carrying off natives who were to be taught Portuguese, so that on future occasions they might act as interpreters. Near Cape St. Bras he saw native fishgarths, and hence called that double of the Bill of Portland *Ponta das Cambóas.**

When about 160 miles beyond the second padrão set up by him in 1483, he reached a second *Monte Negro*, a remarkable headland in 15° 41′ S., rising like an island to a height of 200 feet, and presenting a rugged black face towards the sea, and upon this he set up a padrão. The bay to the south he named *Angra das Aldeas*, because of two poor fishing villages. In design and size this padrão resembles that of Cape Cross. A trace of the royal crown is still visible, but time has obliterated the inscriptions.†

The aspect of the country had gradually grown poorer and poorer, until barren sandhills and arid rocks were all that could be seen from the sea, except at a few openings where streams or rivers had given birth to vegetation and verdure (*praias verdes*). Lofty mountains now and then were visible far inland. Passing along such a coast of low sandhills and white cliffs, Cão come past the broad Golfo da Baleia (Whale bay), separated by a "sleeve of sand" (Manga de Areia) from the open sea; he must have noticed the low black rocks with yellow specks, first known as Cabo preto;‡ and ultimately reached a truncated cone of red sandstone, in 21° 50′, upon which he set up the last of his padrões, already fully described by us. This was one of the Cabos do padrão of old charts, and is now known as Cape Cross. To the south of it, on Martellus Germanus's chart, we notice a Praia das Sardinhas (Sardine shore), now known as Sierra bay, and a Serra parda, which may safely be identified with the dark and rocky cliff now known as Cabo dos Farilhões (22° 9′ S.), surmounted by a sandy dune, and rising inland into peaks—*os montes do padrão.*

This cape, 430 leagues, or 1450 sea miles, to the south of Cape Catharina, is the furthest point reached by Cão, and if a legend on the chart of Henricus Martellus Germanus may be accepted, he died there. This legend is to the following effect:—

"This mountain, called the Black mountain [*i.e.* Monte negro, in 15° 41′] was reached by the fleet of [John] the second King of Portugal, which fleet was commanded by Diegus Canus, who, in memory of this

* Pacheco, 'Esmeraldo,' p. 85.

† Shaft, height, 2·01 m., circumference, 1·08 m.; cube, 0·46 m. high, 0·45 m. broad, 0·19 m. thick (L. Cordeiro, *Boletim*, 1892, and 'Diogo Cão,' p. 66). This pillar is now in the museum of the Lisbon Geographical Society, with the exception of the cross, which had disappeared. A new pillar, of poor design, was erected in its place in 1892.

‡ Subsequently as Cabo frio (Cold cape), because of the cold coast current which runs past it.

fact, set up a marble column, with the emblem of the cross, and proceeded onwards as far as the Serra parda, which is distant 1000 miles from the Black mountain, and here he died" (*et hic moritur*).

A "parecer," or opinion, drawn up by the Spanish astronomers and pilots who attended the congress of Badajoz in 1525, and signed by Hernan Colon, Juan Sebastian del Cano, and others, goes far to confirm this legend, for it tells us that Cão, in the course of his second voyage, discovered the coast from Montenegro as far as the Sierra Parda, where he died (*donde murio*), a distance of 200 leagues (680 sea miles).*

The distance between Cape Negro and Sierra Parda actually amounts to 435 sea miles (139 leagues, or 556 Italian or Roman miles), but if we assume the Mediterranean on the chart of Germanus (which has no scale) to measure 3000 Italian miles in length, as usually adopted, then the distance separating Montenegro from Sierra Parda on that chart would equal 1000 of these miles.

Of course, if Cão died near his last padrão, we are compelled to reject the account given by Ruy de Pina and Barros of the final stages of his expedition, and generally accepted. According to these historians, Cão returned to the Congo, had an interview with the Mani Congo, who expressed a desire for priests to convert his people, masons and carpenters to build churches and houses, labourers to break in oxen, and women to make bread, so that his kingdom might in every respect become like Portugal. He sent Caçuto, one of Cão's hostages, as ambassador to Portugal, and with him the sons of several of his courtiers, desiring that they should be taught to read and write and made Christians. At the same time he sent a present of ivory and palm cloth, the most valuable products of his kingdom.

Now, we have good reason to believe that Caçuto was received by the king in the beginning of 1489, the king being then at Beja, where he and his companions were baptized with much solemnity, the king himself, his queen, and gentlemen of title acting as sponsors.† We know, further, that Caçuto, henceforth known as D. João da Silva, was sent back to Congo with D. Gonçalo de Sousa, King João's ambassador, in December, 1490. Barros‡ says that this happened two years after he had been baptized.

It might reasonably be concluded, from these dates, that Caçuto arrived in Portugal in December, 1488, was baptized at Beja in January, 1489, and again left for Congo, after a stay of two years, in December, 1490. But if this be so, he cannot have come with Cão, for Cão, or his ships,

* Navarrete, 'Colleccion,' iv. (Madrid, 1837), p. 347. Observe an omission after "el dicho cabo."

† Ruy de Pina (who may have been present at this reception and baptism), p. 149; Garcia de Resende, p. 69; Barros, 'Asia,' t. I. i. pp. 177, 227.

‡ 'Asia,' t. I. i. p. 224.

must have been back before August, 1487, in which month Dias started on his voyage, taking with him the people whom Cão had kidnapped. Nay, in all probability Cão's ships came home even earlier, say in September, 1486, for on October 10 of that year Dias seems already to have been appointed to the command of the expedition which was to make him famous for all time.*

Indeed, we are inclined to think that after Cão's death, his vessels returned straight home, and if they did so, and the Eusebian era is stated quite correctly on the padrão of Cape Cross, they can have been away at the outside for thirteen months, that is, from September, 1485, to September, 1486—not a long period, but amply sufficient for a voyage to Cape Cross and back, and a stay of several months on the Congo river.†

The Voyage of Bartholomeu Dias, 1487–88.

No sooner had Cão's vessels returned to the Tagus than King John, whose curiosity had been excited by the reports about the supposed Prester John, brought home by d'Aveiro,‡ determined to fit out another expedition to go in quest of him by doubling Africa, Friar Antonio of Lisbon and Pero of Montaroyo having already been despatched on the same errand by way of Jerusalem and Egypt. The command of this expedition was conferred upon Bartholomeu Dias de Novaes, a cavalier of the king's household, who, if we may trust Fernão Lopez de Castanheda ('Historia,' liv. i. c. 1), held at the time the appointment of superintendent of the royal warehouses (*almoxarife dos amazens*). Portuguese historians speak of this Dias as a kinsman or descendant of João Dias, who was associated with Gil Eannes in doubling Cape Bojador in 1434, and of Diniz Dias, a cavalier of King John I., whom Azurara credits with the discovery of Cape Verde in 1445, but I am not aware of any documentary evidence in favour of these assumptions. There can be no doubt, however, that Dias was a seaman of considerable experience. It may have been our Bartholomew whom King John, in 1478, when still crown-prince, in consideration of 12,000 reis expended in the purchase of a slave, exonerated from payment of the usual royalty on the ivory bought on the Guinea coasts.§ It certainly was our Bartholomew who commanded one of the vessels despatched in 1481 with Diogo d'Azambuja to the Gold Coast.

The appointment seems to have been made in October, 1486, for on

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* See below.

† The embassy of 1490 reached the Congo river in one hundred days. A journey up to the capital and back need at most take forty days.

‡ João Affonso d'Aveiro in 1486 brought the first pepper from Benin to Portugal, as also information of a king Ogane in the interior, who was rashly identified with Prestor John, though in truth the ruler of Ghana or of the Mosi.

§ Sousa Viterbo, 'Trabalhos Nauticos dos Portugueses,' 1898, p. 81.

the 10th of that month King John, "in consideration of services which he hoped to receive," conferred upon Bartholomeu Dias, the "patron" of the *S. Christovão*, a royal vessel, an annuity of 6000 reis.* We shall see presently that ten months were allowed to elapse before the expedition actually left the Tagus.

The account which João de Barros has transmitted to us of the remarkable expedition which resulted in the discovery of the Cape of Good Hope † is fragmentary, and on some points undoubtedly erroneous. Unfortunately, up till now no official report of the expedition has been discovered; but there are a few incidental references to it, which enable us to amplify, and in some measure to correct, the version put forward by the great Portuguese historian.

Most important among these independent witnesses is a marginal note on fol. 13 of a copy of Pierre d'Ailly's 'Imago mundi,' which was the property of Christopher Columbus, and is still in the Columbine Library at Seville. This "note" reads as follows:—‡

"Note, that in December of this year, 1488, there landed at Lisbon Bartholomeu Didacus [Dias], the commander of three caravels, whom the King of Portugal had sent to Guinea to seek out the land, and who reported that he had sailed 600 leagues beyond the furthest reached hitherto, that is, 450 leagues to the south and then 150 leagues to the north, as far as a cape named by him the Cape of Good Hope, which cape we judge to be in Agisimba,§ its latitude, as determined by the astrolabe, being 45° S., and its distance from Lisbon 3100 leagues. This voyage he [Dias] had depicted and described from league to league upon a chart, so that he might show it to the king; at all of which I was present (*in quibus omnibus interfui*)."

The same voyage is referred to in a second "note" discovered in the margin of the 'Historia rerum ubique gestarum' of Pope Pius II., printed at Venice in 1477. From this second note we learn that "one of the captains whom the most serene King of Portugal sent forth to seek out the land in Guinea brought back word in 1488 that he had sailed 45° beyond the equinoctial line." ‖

Las Casas ('Historia de las Indias,' lib. i. c. 7) assumed these notes to have been written by Bartholomew Columbus, whom, as the result

* Albano da Silveira (*Annaes mar. e col.*, v., 1845, p. 55) first published the royal rescript, since reprinted by Texeira de Aragão ('Vasco da Gama,' 3a ed. p. 24).

† 'Da Asia,' Dec. I. liv. iii. c. 4.

‡ For a facsimile, see 'Raccolta Columbiana' (Rome, 1892), pt. I. t. iii. tav. lxx., No. 23.

§ Agisymba, according to Marinus, was supposed to lie at a distance of 24,600 stadia (41°) to the south of the equator. This grossly exaggerated distance Ptolemy arbitrarily reduced by one-half, and on his map Agisymba lies beyond the Mountains of the Moon.

‖ See 'Raccolta,' serie B, No. 6.

of a misconception of the meaning of the concluding words of the note, he supposed to have taken part in this voyage. These assumptions, however, are absolutely inadmissible, for as early as February 10, 1488, Bartholomew had completed at London a map of the world for Henry VII.* If we remember that Bartholomew was detained by pirates for several weeks before he reached England, he must have left Lisbon towards the end of 1487. He did not return to that place until many years afterwards.

On the other hand, the note is unhesitatingly recognized as in the handwriting of Christopher by such competent authorities as Varnhagen (*Bulletin Paris Geog. Soc.*, xv., 1858, p. 71), d'Avezac (*ibid.*, xvi., 1858, p. 268), H. Harrisse ('Fernand Colomb.' (Paris, 1872), p. 120),† Asensio ('Cristobel Colon,' i. pp. 137, 217), and Cesare de Lollis, the editor of the 'Raccolta Colombiana,' published at Rome in 1892 (pt. i. t. iii. p. ix.).

And if Christopher is the author of these notes, they must have been written in 1488, for it was on March 28, 1488, that King Manuel, in response to an application, cordially invited his "especial friend," Christopher Columbus, to come to Lisbon, promising him protection against all criminal and civil proceedings that might be taken against him.‡ Such a promise was needed, for Columbus, in 1480, stole away from Lisbon without paying 220 ducats, which he owed to certain of his creditors.§ Columbus, when he received this royal invitation, was at Seville, where his son Ferdinand was born unto him on September 28, 1488. If he left Seville soon afterwards, he may certainly have been present on the memorable occasion, in December, 1488, when Bartholomeu Dias rendered an account to the king of the results of his hope-inspiring voyage.

If, then, Bartholomeu Dias returned in December, 1488, after an absence (according to De Barros) of sixteen months and seventeen days, he must have started towards the end of July or in the beginning of August, 1487; and if the Bartholomeu Dias referred to in the royal rescript of October 10, 1486 (*v.* preceding page) is the discoverer of the Cape, which hardly admits of a doubt, he cannot have started in July,

* For the curious inscription on this map, see Las Casas, 'Historia' (Madrid), i. p. 225, and list of errata, where "anno domini quater centesimo octiesque uno atque insuper anno octavo: decimque die tum tertia mensis Februarj" is correctly rendered February 13, 1488.

† Harrisse subsequently ('Christopher Colomb.' (Paris, 1884), ii. p. 19) changed his views. He assumes, erroneously as we conceive, that Dias returned in December, 1487, and that Christopher Columbus cannot have written this "note," as he is known to have been in Spain at least up to October, 1488, but that his brother Bartholomew may have done so.

‡ For the king's letter of invitation, see Navarrete, 'Collecion de los Viagens,' 2a ed. ii. p. 10; and Asensio, 'Cristobal Colon.,' ii. p. 132.

§ In his last will and testament, dated May 19, 1506, he charged his son Diogo to pay these debts "for conscience' sake" (Asensio, 'Cristobal Colon.,' ii. pp. 131–138).

1486, as usually assumed. He cannot have been in Lisbon in December, 1487.

This date (namely 1488) is further confirmed by Duarte Pacheco Pereira, the "Achilles Lusitano" of Camoens ('Canto,' x. 12), for in his 'Esmeraldo de Situ Orbis,' written soon after 1505, but only published in 1892, we are told that the Cape was discovered in 1488.* And Pacheco is a very competent witness, for Dias, on his homeward voyage, met him at the Ilha do Principe.†

Turning back now to Colon's "note," we find that Dias is supposed to have sailed 450 legoas, or 25·3°,‡ to the south of Cão's furthest; and as Cape Cross actually stands in lat. 21·8°, this would have brought him to lat. 47·1° S. A return voyage of 150 legoas, or 8·5° to the northwards, would have reduced his latitude to 38·6° S. But if Colon assumed Cape Cross to be in lat. 19° S., as on Dr. Hamy's and the Cantino charts, then the highest latitude reached would have been 44·3° S. We are justified in concluding from this that Colon's 45° does not refer to the Cape, but to the highest latitude reached. As to the 3100 leagues (174 degrees), the supposed distance from Lisbon, we have evidently to deal with a slip of the pen, for the distance to the Cape, following the coast, is only 6000 miles, or 100°.

A further statement respecting the date of the discovery of the Cape appears in the *Parecer*, or "opinion," of the Spanish astronomers and pilots already referred to. They say, "And beyond this [the Sierra Parda, where Cão died], Bartolomé Diaz, in the year 1488, discovered as far as the Cabo d'El-Rei, a distance of 350 leagues; and thence to the Cabo de boa Esperança, 250 leagues; and thence D. Vasco da Gama discovered 600 leagues . . ."

The distances given are exaggerations, for it seems to have been the object of these "experts" to push India and the Moluccas as far to the east as possible, so that the latter might fall within the Spanish sphere: the coast-line actually discovered by Dias measures less than 380 leagues. The nomenclature given is curious, for the designation of Cabo d'El-Rei is bestowed upon the Cape of Good Hope, and the latter name, not inappropriately, transferred to the furthest point reached by Dias. I have not come across a single chart or document bearing out this nomenclature.

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* 'Esmeraldo,' pp. 90, 94. Pacheco was born at Lisbon about 1450; served for years on the Guinea coast; was to have gone, in 1498, to the West Indies; accompanied Cabral to India in 1500, and Albuquerque in 1503; heroically defended Cochim, and came back to Lisbon in 1505. He was governor of S. Jorge da Mina, 1520–22, and died 1533, having been in receipt of an annuity since 1524. (See Raphael Bastos' introduction to the 'Esmeraldo.')

† De Barros, 'Da Asia' (Lisbon, 1778), t. I. v. ii. p. 191.

‡ Reckoning 1 degree = 17·74 legoas, the legoa of 7500 varas being = 6269 m.

There remain to be noticed two references to the expedition of Dias in the 'Roteiro' describing Vasco da Gama's first voyage, for which we are indebted to Pero d'Alemquer, the pilot of Dias' flagship;* and the statement of John of Empoli, the supercargo of one of the vessels of Affonso de Albuquerque's fleet (1503), that the Bahia dos Vaqueiros of Dias was renamed Bahia de St. Braz, because it was discovered on the day of that saint.†

Dias is supposed to have erected three padrões, but only one of these has up till now been discovered; and as the inscription upon it is no longer legible, it furnishes no evidence of the date of the voyage.

FRAGMENTS OF A PADRÃO OF B. DIAS, 1487.

This pillar stood on Dias Point, south of Angra pequena, or Lüderitz bay. Sir Home Popham saw it in 1786, but even then the inscription could no longer be deciphered.‡ Captain Vidal, in 1823, found the pillar in fragments.§ The shaft, of marble, rose originally about 6 feet above the ground, and was buried to a depth of 21 inches; it was surmounted by a stone cross 16 inches high. In 1856 Captain Carrew brought three fragments to Capetown, two of which, in 1865, were handed over to Chevalier du Prat, and are now at Lisbon; whilst the third, 22 inches high, 8 inches broad, and 5½ inches thick, is still in the Cape museum.‖ Of the fragments now at Lisbon, the kindness of my friend Captain E. de C. e Vasconcellos enables me to publish an illustration.

The "pillars" carried away by Dias seem to have resembled those entrusted to his predecessor, Cão, except that, in addition to the royal arms, there was carved upon them a pelican, the device which King John had assumed when a prince, together with the motto, "Por tua ley e por tua grey." Such, at least, would appear to have been the case, to judge from the description of a series of pictures, illustrating the discovery of India, which were to have been painted by order of King Manuel.¶

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* See 'A Journal of the First Voyage of Vasco da Gama' (Hakluyt Society), pp. 9, 14.

† Ramusio, i., 3rd ed., fol. 144.

‡ Rennel's 'Geography of Herodotus,' p. 698.

§ Owen, 'Narrative of a Voyage to Explore the Shores of Africa' (1843), ii. p. 269.

‖ See L. Sclater's paper, with remarks by Luciano Cordeiro in the *Transactions of the South African Philos. Society*, 1898, p. 255.

¶ See 'Alguns Documentos' (1892), p. 516; and Ruy de Pina, p. 65. Duarte Pacheco, 'Esmeraldo,' p. 97, says the inscriptions upon the pillar supposed to have been erected on St. Cruz were in Latin, Arabic, and Portuguese, and that it was visible from the sea. It is quite clear to us that Pacheco never saw this padrão, for when referring to the pillars set up by Cão during his two voyages, he says likewise that the inscriptions were in three languages, when, as a matter of fact, we now *know* that no Arabic inscriptions were to be found upon the pillars (see *ante*, pp. 628, 634).

Apart from what can be gathered from the above, and from a few early maps, we are dependent upon De Barros for what we know concerning the voyage of Bartholomeu Dias. Other historians have either slavishly copied him, or they adduce no fresh information. Strange to say, Ruy de Pina and Garcia de Resende, the chroniclers of King John II., although they refer casually to the discovery of the Cape of Good Hope, do not once mention the name of Bartholomeu Dias. As for Correa, the author of the 'Lendas da India,' he may safely be discarded.*

Bartholomeu Dias was given the command of two ships, of fifty tons each, and of a store-vessel.† His flagship, we think, must have been a *Christovão*, perhaps the very vessel which he commanded before his departure in 1486, and again in 1490–95; or possibly a new vessel bearing the familiar name. His chief pilot was Pero d'Alemquer, an experienced seaman, who subsequently served under Vasco da Gama. The master's name was Leitão. The second ship, the *St. Pantaleão*, had for its captain João Infante, a cavalier of the king's household, with whom were Alvaro Martins as pilot, and João Grego as master. The store-vessel was placed in charge of Pero Dias, a brother of Bartholomew. João de Santiago was pilot, João Alves master, and Fernão Colaço, of Lumiar, clerk.

There were on board two negroes whom Cão had kidnapped, as also four negresses from the Guinea coast. Strict orders had been given, not only to avoid every conflict with the natives, but also to gain their confidence by gifts. The four Guinea women were to be landed at various places, handsomely dressed, and furnished with samples of gold, silver, and spices, which the Portuguese were in quest of. These they were to exhibit wherever they went, proclaiming, at the same time, the greatness and munificence of the King of Portugal, and the ardent desire which possessed him to communicate with Prester John. Women were selected for this duty, as they would be respected even in the midst of tribal wars.

Dias, we have no doubt, was furnished with a copy of the chart compiled by D. Diogo Ortiz de Vilhegas, of Calçadilha, Dr. Rodrigo, of Pedras Negras (the king's physician), and Master Moses, a Jew, which had been given in May, 1487, to Pero de Covilhã.‡

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* Correa does not mention the name of Dias. According to him, Janinfante, a foreign merchant and practical seaman, had the command. Failing in his attempt to double the Cape, he maintained that vessels larger than caravels were needed to ensure success. The king at once ordered such vessels to be built, but Janinfante died, and the command was given to Vasco da Gama!

† De Barros, 'Asia,' t. I. p. i. p. 184.

‡ F. Alvares, 'Verdadeira Informaçao,' c. 103.

The expedition left Lisbon at the end of July or in the beginning of August, 1487, and sailed direct for the Congo, beyond which the coast was examined with attention, capes and bays being named either after saints, on account of striking physical features, or in connection with some occurrence in the course of the voyage. On reaching the Angra do Salto, which we conceive to be identical with the Golfo das Aldeas,* now known as Port Alexander, the two negroes carried off by Cão were restored to their friends. It is just possible that the store-vessel was left in this safe and commodious harbour, where fish abounded, good water was plentiful, and natives with herds of sheep and bullocks within reach.

Struggling against south-westerly winds and a current setting to the north, Dias passed the last pillar set up by Cão.† He may have named the country to the south in honour of S. Barbara, whose day is December 4, and entered on December 8 the Golfo de S. Maria da Conceição, our modern Walvisch bay. Here he seems to have tarried, for, taking the saints' names bestowed along this coast for our guide, the next locality named by him must have been the Golfo de S. Thomé (December 21), only 145 miles beyond. It cannot have taken a fortnight to make so short a run. It was probably here that the first negress was landed.

We may then suppose Dias to have sailed southward along the desolate coast of sandhills, where he possibly experienced the hot blasts of an easterly wind, and hence bestowed upon this forbidding region the appropriate name of "Areias gordas," that is, "hell." The gulf of St. Thomas was probably named on December 21, and a few days afterwards Dias arrived at the Cabo da Volta and the Serra parda, where he erected the padrão dedicated to Santiago, fragments of which have been recovered, and have already been referred to. He also landed here the second of his negresses, probably leaving her with natives who had come down to the shore to fish.‡

* Cosa's Golfo do Saco and the G. do Salto of the Cantino map refer, no doubt, to the same locality. Cosa places the name near where Port Alexander should be, whilst Cantino locates it on a barren coast between that port and Great Fish bay, not frequented even by fishermen.

† We have absolutely no direct information about Dias's proceedings from the time he left Angra do Salto to his arrival at Cabo da Volta, where he set up his first pillar.

‡ De Barros's account of this important section of the voyage is very confused. He tells us (pp. 185, 186) that the first padrão, that of Sant Iago, was set up on a Serra parda, at the Angra dos Ilheos, in 24° S., or 120 leagues (400 miles), beyond Cão's furthest. But 120 leagues beyond Cão's furthest, which Barros (p. 175) assumes to have been in 22° S., would carry us to 28° 20′, or within 50 miles of an Angra das Voltas, which he places in 29° S., and which it is thought survives in Cape Volta, to the south of the Orange river, in 28° 42′ S.

It seems thus that the two localities, which De Barros separates by an interval of 5°, cannot in reality be very distant from each other.

On Cantino's chart, the deep bay to the east of this cape, our modern Angra pequena, is called Golfo de S. Christovão, and this, it appears, was the name originally bestowed upon a bay which subsequently became known as Angra or Golfo das Voltas—the "bay of tacks." *

It is not probable that Dias remained long in this bay. De Barros tells us that he stood off and on for five days, when there arose a strong wind, which compelled him to reduce his sails, and before which he ran south for thirteen days. This statement we are not prepared to accept, for northerly winds are exceedingly rare along this coast, and the squalls from the north-north-east or north-north-west, which are experienced occasionally, are never of long duration. But when Dias reached a higher latitude on the south-east edge of the Agulhas bank, and came under the influence of the "roaring forties," it is very likely that he met with gales and a heavy sea, and, considering the small size of the vessels, his men are to be excused if they stood in "mortal fear;" † and they naturally suffered from the cold, for in these latitudes they experienced a mean temperature of 50° or less, which is hard to bear for men fresh from a tropical climate.

During the first period of this long stretch to the south, Dias may be supposed to have kept within sight of the coast. He may thus have named the Golfo de S. Estevão, now Elizabeth bay, on December 26, and the Terra da Silvestre on December 31. He may even have heard the roar of the rollers thundering upon the shore of the Terra dos Bramidos,‡ and gained a view of the lofty Serra dos Reis on January 6,§ but beyond these he lost sight of the land, and when passing St. Helena bay, as we learn from Pero d'Alemquer, he was far out at sea.‖

When the storm subsided, Dias stood east, and having failed, in the course of several days, to meet with land, he turned his prow to the northward. Sailing in that direction for 150 leagues, he saw lofty mountains rising before him, and came to anchor in a bay which he called Bahia dos Vaqueiros (Cowherd's bay). This happened on

* Barros, p. 186, says, "*now* known as Angra das Voltas." Of the identity of this bay with our Angra pequena there can be no doubt. It is quite true that Duarte Pacheco places the Angra das Voltas in 29° 20′ S., the Strassburg Ptolemy in 28° S., and De Barros in 29° S.; but, on the other hand, Juan de la Cosa places this bay in 24° S., and the author of Cantino's chart in 26° 30′ S., its true latitudes being 26° 40′ S. Duarte Pacheco, in his 'Esmeraldo,' describes it as being 1 league broad at the mouth, 1½ league deep, affording a safe anchorage for a hundred vessels in from ten to twelve brasses. The only bay along this coast fitting this description, or the contours of our ancient maps, is our Angra pequena.

† De Barros, p. 187.

‡ "Bramidos" means "roars."

§ That is, mountains of the three magi.

‖ See 'A Journal of Vasco da Gama's First Voyage' (Hakluyt Society), p. 9.

February 3, 1488, and as this day is dedicated to St. Blaise, the bay, so we are told by John of Empoli,* was renamed Bahia de S. Braz. It is the Mossel bay of our days.

We learn from Pero d'Alemquer that the natives refused the presents which were offered them, and when Dias landed to take in water from a well close to the beach, he was pelted with stones. One of the natives was killed with an arrow from a crossbow, and they then retreated inland with their cattle.

During his onward course Dias had to struggle against the Agulhas current, as also against the prevailing south-easterly winds. He may, however, have taken advantage of an inshore counter-current, setting eastward, as also of occasional westerly winds. At all events, he made his way along a coast bounded by lofty mountains. Rounding Cabo do Recife (Cape Recife), he entered a vast bay, which was called Bahia da Roca (Rock bay), but which is now known as Algoa bay. Within it lay a group of rocky islets—the Ilhéos da Cruz. Duarte Pacheco ('Esmeraldo,' p. 94) says that the tallest of this group is also known as Penedo das Fontes (Fountain rock) because of two springs which rise upon it, and that Dias erected a pillar there, visible out at sea. As a matter of fact, the largest of these islets is nearly all bare rock, and there are no springs. Nor does it appear, if we may accept the results of M. de Mesquito Perestrello's careful survey of this coast in 1575,† that a stone pillar was ever set up on this islet, notwithstanding the name it bears.

It is, however, possible that Dias erected a wooden cross upon it, all traces of which had disappeared when Perestrello examined the coast. The islet may have been named because it was discovered on the day of the invention of the cross (May 2). In that case Dias must have spent three months in making good the 200 miles which separate it from Mossel bay, which is difficult to believe.

Having left here the last of his negresses—one had died during the voyage—in the company of two women who were gathering shellfish along the beach, Dias continued his voyage. He sailed past the Ilhéos chãos (Low islands), and about 12 miles beyond them, at or near a sandy cliff, still known as Cape Padrone, he set up a padrão dedicated to S. Gregorio.‡ It is quite possible that this pillar was erected on St.

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* John of Empoli sailed with Affonso de Albuquerque to India in 1503. He was supercargo of a vessel chartered by the Marchiones of Lisbon. His narrative was published by Ramusio, i. 3rd ed. f. 144.

† Published in Pimental's 'Arte de Navegar' (Lisbon, 1762), pp. 446–456.

‡ Perestrello says the pillar stood on an islet at the foot of this cliff, the only islet between the Ilhéos chãos and the Rio do Infante, but only sunken rocks are met there now, and the islet may have been destroyed by the force of the breakers. I do not gather from Perestrello's account that he himself saw the pillar.

Gregory's day (March 12), though as a rule these dedications seem to have been made at home.

It was probably about this time, when the coast was actually seen to stretch away towards the north-east, in the desired direction, that the ship's companies began to murmur about the hardships to which they were being exposed. Dias, whose *Regimento*, or instructions, directed him to consult his officers on all occasions of importance, therefore invited them to land with him, together with a few leading seamen. The result of this council was a decision in favour of a return, and a document to that effect was signed by all present. Dias, however, persuaded his followers to go on eastward for two or three days longer, and promised that, unless something happened within that period to induce them to change their minds, he would accede to their wishes.

He was thus able to pass the remarkable rock identified by Perestrello with the Penedo das Fontes, where the dammed-up waters of a small stream soak through the beach ridge. This, I have no doubt, is Ship rock.* The Rio do Infante (Great Fish river) lies only about 16 miles beyond.† It was thus named because the captain of the *Pantaleão* was the first to land at its mouth. Here Dias turned back; Galvão ‡ says that he saw "the land of India, but, like Moses and the promised land, he did not enter it."

On passing his padrão, "he took leave of it as from a beloved son whom he never expected to see again." His forebodings proved true, for twelve years afterwards, when on a voyage to India in Cabral's armada, he perished almost within its sight.

During his homeward voyage Dias was favoured by winds and currents. It is almost certain that he named the Cabo do Infante, and probably that he dedicated the southernmost cape of all Africa to St. Brandan, an apocryphal Irishman, whose day is May 16.§

It was soon after this that he beheld, for the first time, and coming from the east, the remarkable group of mountains—broken land, or "terra fragosa," as the ancient maps have it—which fill Cape Peninsula,

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* See 'Africa Pilot,' pt. ii. (1889), p. 126.

† Perestrello says 5 legoas, that is, 17 miles.

‡ 'The Discoveries of the World,' 1555 (Hakluyt Soc.), p. 77.

§ The Cabo (or rather Golfo) das Agulhas first appears on Cantino's chart. On all our ancient charts (2, 4, 5, 6, 7) the Cape of Good Hope is indicated as the southernmost point of Africa. Pacheco, in his 'Esmeraldo' (pp. 90, 92), places the Cape of Good Hope and St. Brandan's point in the same latitude, viz. 34° 30', and makes no mention of a Cabo das Agulhas, but in his 'Table of Latitudes' (p. 15), the latter is placed in 35° S., or 30' further south than the Cape, whilst St. Brandan's point is omitted. This almost looks as if the two names referred to the same locality.

the southern extremity of which, if we may believe Barros (p. 190), he named Cabo Tormentoso, in memory of the storms which he had experienced, a name which the king, whose hopes of reaching India by an ocean route seemed about to be realized, changed into Cabo da boa Esperança—the Cape of Good Hope.* We fancy that this is one of those pretty legends frequently associated with great events. Duarte Pacheco, a contemporary, distinctly tells us that it was Dias who gave the Cape its present name; Christopher Columbus, who was present when Dias made his report to the king, says the same. Barros, indeed, seems alone to be responsible for this legend, for if Camoens ('Canto,' v. 50) speaks of a "Cabo Tormentorio," we must remember that he lived through the terrible tempest which overwhelmed a part of Cabral's fleet. This was during the season of storms, in winter. Dias, who spent several months on the south coast, may of course have met with gales, which would justify an appellation such as "Cape of Storms." Still, on his homeward voyage, when alone he was in the immediate vicinity of the Cape, he seems to have been fortunate, for Pero d'Alemquer, his pilot, informs us that he left the Cape on a morning with a stern wind, which rapidly carried him northward.†

Before leaving the Cape, Dias erected the last of his padrões, which was dedicated to St. Philip.‡

After an absence of nine months, Dias rejoined his store-ship. He found that six men had been killed in a trade dispute with the natives, and Fernão Colaço, one of the three survivors, died of joy on beholding his comrades. The vessel, being worm-eaten, was burnt after the provisions had been taken out of her.

It was now about the middle of August, if we assume Dias to have parted from his store-vessel about the middle of November. There thus remained four months for making his way to Lisbon. Of what he did during these four months we know very little. We do not even know whether he called at the Congo.§ We know, however, that he touched at the Ilha do Principe, where he met Duarte Pacheco with part of his shipwrecked crew,‖ all of whom he took on board; that he then touched at Rio do Resgate—trade river—where he seems to have purchased some slaves, "so as not to come home empty-handed;" that João Fogaça, the Governor of S. Jorge da Mina, placed on board his vessel the gold he had obtained by barter; and that ultimately, in

* We have already seen that, according to the Spanish pilots, the Cape was originally called Cabo d'El-Rei (see p. 641).

† 'A Journal of the First Voyage of Vasco da Gama' (Hakluyt Soc.), p. 9.

‡ The site of this pillar is absolutely unknown.

§ The question of whether it was he or Cão who brought the envoy of the King of Congo to Portugal has already been discussed, p. 637.

‖ De Barros, *loc. cit.*, p. 191.

December, 1488, after an absence of sixteen months and seventeen days, he once more entered the Tagus. Dias had discovered 373 legoas or 1260 miles of coast; and his voyage, jointly with the reports received by that time from Pero de Covilhã, had demonstrated the fact that India might be reached by sea.

We are not aware that Dias ever received a reward for his great achievement. It seems not, for between 1490 and 1495 he still commanded the *Christovão*,* and when King John had overruled the objections of his advisers, who thought it unwise to expend, and possibly exhaust, the resources of the kingdom in distant adventures, which, even if successful, would raise against Portugal all those who now profited, or who in the future hoped to profit, from the India trade, it was not Dias who was placed at the head of the expedition which was to crown the enterprise started by Prince Henry. Dias was merely employed to superintend the building and outfit of the vessels intended for this expedition, the command of which was given by King John's successor, King Manuel, to Vasco da Gama.†

APPENDIX.

On the Maps illustrating the Voyages of Cão and Dias.

In writing the accounts of the voyages of Cão and Dias, we have largely profited by a few contemporary maps. These maps, unfortunately, are on a very small scale. This compelled their compilers to confine themselves to a selection among the place-names which they found upon the sailing charts at their disposal, and this selection may not in all cases have been a judicious one.

Another difficulty arises from the fact that successive explorers failed to identify the places already named by their predecessors, or deliberately set aside the claims of priority. As a result, Benguella bay became successively known as Angra de S. Maria, Bahia da Torre, das Vaccas, and de S. Antonio; and Saldanha's name, instead of being attached to Table bay, is conferred upon a bay which originally seems to have been dedicated to S. Lucia.

Of course, much of this confusion is due to the utter failure of these early explorers to determine accurately the latitudes of the places they visited. José Visinho, whom King John sent to the Guinea coast in 1484 or 1485 for the express purpose of determining latitudes by observing the declination of the sun, reported that the Los islands were in 5° N., when in reality they are in 9° 30′ N.; and Bartholomeu Columbus, to whom we are indebted for this information, adds that

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* For an acquittance for 4,080,912 reals expended during these five years, dated February 27, 1498, see 'Alguns Documentos,' p. 19. The Bart. Dias who commanded the *Figa* in 1497 was not the great navigator, as believed by H. Lopes de Mendonça and the editor of 'Alguns Documentos,' who publishes a facsimile, p. 515.

† Dias accompanied Vasco da Gama, in 1497, as far as the Cape Verde islands, and thence sailed to the Gold Coast. He commanded a vessel in Cabral's fleet, and perished off the Cape in 1501. His grandson, Paulo Dias de Novaes, won fame as the firs conquistador of Angola.

he himself found by observations with a quadrant that the Gold Coast was under the equator.*

The earliest map to which we are able to refer is to be found in a codex which originally belonged to the family of Count Cornaro-Piscopi, then found its way into the Palace of the Doges, and may now be consulted in the British Museum (Eg. 73).† The volume contains 35 charts by various draughtsmen, collected in 1489. The charts which concern us are numbered 30 to 33 (originally 28–31). No. 30 is a chart of the Atlantic coast from Cape Finisterre to Cape Verde, and is stated to be by Cristoforo Soligo, a Venetian cosmographer‡—that is, Soligo copied it from some Portuguese original. Nos. 31–33 give a delineation of the entire coast from Portugal to the "ultimo padrão," set up by Cão on Cape St. Mary in lat. 13° 26′ S. In character these charts resemble No. 30, and I venture to ascribe them to Soligo or Seligo as copyist, not author.§ They were evidently drawn immediately after Cão's return from his first voyage in 1484 or 1485.

The charts are furnished with scales, but are still without parallels. A legend, written right against the mouth of the Niger, tells us "hic non apar polus," but this invisibility of the pole-star is not borne out by the scale of the chart. Assuming 75 Italian miles to be equal to one degree, the following latitudes would result from measurements made upon the charts:—

	On Charts.	Actual position.
Lisbon, assumed ...	38°·70 N., 9°·17 W.	... 38°·70 N., 9°·17 W.
Cape Verde	15°·37 N., 16°·02 W.	... 14°·75 N., 17°·53 W.
Cape Palmas	6°·17 N., 3°·66 W.	... 4°·35 N., 7°·45 W.
Niger mouth	9°·24 N., 10°·93 W.	... 5°·00 N., 5°·00 E.
Cape Lopez	2°·97 N., 15°·13 E.	... 0°·60 S., 8°·73 E.
Congo mouth	4°·43 S., 19°·41 E.	... 6°·07 S., 12°·15 E.

Our second map is by Henricus Martellus Germanus. It is one of many in a manuscript, 'Insularium illustratum,' now in the British Museum (Add. MS. 15,760). It is a map of the world very roughly drawn and without a scale, and is dated 1489, and thus shows the discoveries up to the return of Dias—1488. The author appears to have been an Italian, or if a German (Heinrich Hammer) he lived in Italy. Count Lavradio published a facsimile of this map of the world in 1863.

Behaim's famous globe is next in date, viz. 1492. As its author claims to have commanded one of the ships of Cão's second expedition, it might have proved of exceeding value had not the delineation of the south-west coast of Africa been intentionally falsified in order to make the Nurembergers believe that their clever townsman had doubled the cape and sailed a considerable distance beyond it.

The remaining cartographical materials available are the chart of the world by Juan de la Cosa (1500); a chart by an unknown author, now in the possession of Dr. Hamy (1502); a chart which Alberto Cantino caused to be designed at Lisbon for his patron, Hercules d'Este, Duke of Ferrara (1502); and a chart by Nicolas de Canerio of Genoa (1502). For an account of these charts, I refer to 'A Journal of the First Voyage of Vasco da Gama,' published by the Hakluyt Society in 1898, pp. 205–211.

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* *Raccolta Columbiana*, I. t. iii., Serie B, No. 861; Serie C, Nos. 246 and 499.

† Zurla, 'Sulle antiche Mappe' (Ven., 1818), p. 88; D'Alberti, 'Le construzione navali' (Rome, 1893), p. 128.

‡ Zurla, 'Dei viaggi i delle scoperte Africane di Aloise Cadamosto,' pp. 21–23.

§ That these charts are not by the same author is seen from the fact that on No. 30 Cape Verde lies 1930 miglie to the south of Lisbon, on No. 31 only 1750 miglie.

‖ The copies of Dr. Henry's and Cantino's charts which accompany this paper are reprinted by kind permission of the Hakluyt Society.

LIST OF PLACE-NAMES.

The figures within brackets refer to the authorities, viz. (1) Soligo; (2) Henricus Martellus; (3) Behaim; (4) Juan de la Cosa; (5) Dr Hamy's chart; (6) Cantino's Chart; (7) Canerio; (8) Duarte Pacheco's 'Esmeraldo.'

The dates are those of the Saints mentioned.

Rio (*Angra*) *de S. Maria da Nazareth* (1–8). The Ogowe, which still enters Nazareth bay, 0° 40′ S.

Cabo de Lopo Gonçalves (1–8). Cape Lopez, 0° 37′ S.

Rio de S. Mathias (2, 3), February 24. Now the Mexias or Animba river, 0° 55′ S.

Praia do Judeo (3). The bay to the north of the Fernão Vaz river, 1° 15′ S.

Rio de S. André (3), November 30, is probably the same as the Rio das barreiras (8), subsequently known as Fernão Vaz, 1° 23′ S.

Rio de Campo (1), the river Kama, 1° 47′ S. It may have been named after Antonio do Campo, who accompanied Vasco da Gama on his second voyage.

Cabo de S. Catharina, November 25, where stood the "tree" of Fernão Gomez (1–8). Still known by its original name, 1° 50′ S.

Cabo de Pero Dias (7). Corrupted into Pedras point, 2° 41′ S.

Serras do Espirito Santo (3, 4, 6, 7). Still known by that name, 2° 50′ S.

Praia do Imperador, Emperor's shores (2, 3). Either off the Sette, 2° 24′ S., or off the Nyango, 3° S.

Ponta das barreiras, Cliff point (4), *Serra da Praia* (6), or *Cabo primeiro* (7). Cape Mayumbe, a red bluff, in lat. 3° 13′ S.

Golfo de Alvaro Martins (4, 6). Now Mayumbe bay, 3° 20′ S. It may be identical with Behaim's *Angra de S. Martha*, July 27.

Serra de barreiras (4). The white cliffs, backed by three ranges of hills (part of the *Serra comprida* or "Long Range" of old charts) to the south of Mabuti point, 3° 23′ S.

Os dous Montes, the Two Mountains (1, 7), or *Ponta dos Montes* (6), the two "Paps" of Banda point, or Cabo segundo, 3° 53′ S.

Barrocas das favaes, Bean-field ravines (6). The white cliffs to the south of Banda point.

Golfo do Judeu, Jews bay (2, 5). Castilho, guided by Pimental, identifies it with Kilongo bay, 4° 12′ S., and this I accept, although the *G. do Judeu* of Behaim's globe seems to represent Loango bay, whilst his *Golfo de S. Nicolão*, December 6, occupies the place of Kilongo. The Jew, later on, was converted into an Indian, and hence already on Reinel's chart (c. 1520), the bay between the *Cabo segundo* and the *Duas moutas* at the Kuilu, is called *Golfo do Indio*. The Repertorio dos tempos (1521), however, has an Angra da Judia two degrees to the north of the Congo, and Reinel's position only suits Kilongo bay. Later authorities distinguish between a Golfo do Judeu and a G. do Indio, identifying the latter with Loango bay. This I believe to be a duplication due to corrupt spelling.

Serra corasa (*corada*, "red, coloured") *de Corte Reial* (3), seems to refer to Mount Salombo and the red cliffs near it, 4° 20′ S.

As duas moutas, the "two copses" of Reinel, are identical with two wooded eminences known as the Paps of Kuilu, 4° 28′ S.

Praia and Serra formosa de S. Domingos, August 4, of Soligo stands clearly for Loango bay, 4° 38′ S. The "*Praia formosa*" and "*terra de S. Domingos*" of Cantino's chart, the *Ponta formosa* of Behaim, the "*praia formosa*" of Dr. Hamy's chart, and the *Praia de S. Domingos* of Canerio's, all refer to the same locality.

Cabo dos baixos, Cape of the Shoals (7). Beach point, 4° 50′ S.

Ponta branca, White point (1). Perhaps Massabe point, 5° 2′ S.

Golfo de S. Martinho (2, 3), November 11. Kakongo and Landana bay, 5° 10′ S.

Ponta formosa (3). A conspicuous bluff on Landana bay, 5° 13′ S.

Ponta da barreira vermelha, Red Cliff point (1, 4). A red clay cliff on Malemba bay. 5° 20′ S. The "Red cliffs" extend south to Cascaes point, 5° 23′ S.

Golfo das Almadias, Boat bay (3, 4, 6, 7). Undoubtedly Kabenda bay.

Ponta dos Almadias (4). Kabenda point, which subsequently became known as Ponta do Palmar, 5° 33′.

Cabo do Palmar, Palm-grove cape (4, 6, 7). Red point, 5° 44′ S., where there is a palm grove, to judge from the charts.

Ponta do Paul, Swamp point (1). At the mouth of the Congo.

Rio poderoso, Powerful river (2, 3), *Rio do Padrão*, River of the Pillar (3, 4, 8), *Rio de Mani congo* (6, 7), *Emzaze* (8), is our river Congo.

Cabo or *Ponta do Padrão* (1, 2) and *Padrão primeiro* (7). The cape where Cão set up his first pillar, that is, Shark point at the Congo mouth, 5° 4′ S.

Cabo redondo, "Round cape" (6), corrupted on Behaim's globe into *muoruodo*, is Margate head, 6° 31′ S.

Serra formosa (6). The hills south of preceding.

Cabo redondo (1, 2). A cape near Funda bay, 6° 55′ S.

Ponta delgada (6). Loje point, low and sandy, 7° 48′ S.

Rio de Magdalena (1, 3, 4), July 22. The Loge river, 7° 58′ S.

Rio de Fernão Vaz (1, 3, 4). The river Dande, 8° 28′ S.

Rio Mondego (6). The river Bengo, 8° 42′ S.

Angra Grande (1), or *Golfo do Mestre* (6). Bengo bay.

Punta de Miguel (3), September 29, or *da Espichel* (4). The Morro das Lagostas, 8° 45′ S.

Ilhas das Cabras, Goat islands (3, 4, 6, 8). The islands opposite Loanda city, standing upon a tableland (the *Monte alto* of Behaim; the *Tablado* of Juan de la Cosa).

Punta das Ilhas das Cabras (6). Palmarinhas point.

The river *Kwanzo* is not to be found on early charts. P. Reinel (c. 1520) already knew the native name, and called it *Coamza*.

Cabo ledo, Joyful cape (4), still retains its ancient name. It is a rugged black promontory resembling a lion when seen from north-north-east, 9° 49′ S.

Punta das Camboas, Fish-garth point (6). Now Cabo de S. Braz, 10° S.

Terra das duas Pontas (1) is the Morro of old Benguela, which appears from some bearings as a double point, 10° 45′ S.

Cabo do Pichel, Tankard cape (6), and *Punta de S. Lourenço*, August 10 (4, 7, 8), appear to be identical with the preceding.

Rio de S. Lazaro, December 17 (6). The river Cuvo, 10° 50′ S.

Rio do Paul, Swamp river (1). River Catumbela, 12° 26′ S.

Angra or *Golfo de S. Maria* (1, 2, 6). Benguela bay, 12° 30′ S.

Cabo de S. Maria (5). Ponta de S. Joze.

Castel d'Alter poderoxo (1), *C. de S. Agostinho* (2), *Castel poderoso de S. Agostinho* (3), *Cabo do Castello pedroso* (7). There is a village, Alter pedroso (Stony Alter), near Portugalete (see note, p. 631). The "poderoxo" (powerful) of Soligo is evidently a clerical error. The full name would be Castello d'Alter pedrozo de S. Agostinho, a reference to the pillar set up to the south. I identify this "Castle" with the granite cliffs to the south of Ponta choca, 13° 17′ S.

Cabo do lobo or *dos lobos*, Seal cape (1, 5, 6), upon which Cão erected the pillar dedicated to S. Augustin (August 28); also known as *Ponta Negra* or *Ponta Preta* (8). Now Cape St. Mary, 13° 26′ S.

Ilha do lobo (4). One of the islets near the preceding.

Monte negro (5), or *Cabo negro* (7). The mountains rising above Cabo do Lobo.

Angra de João de Lisbôa (6). The Lucira grande bay, remarkable for its intensely green water, 13° 51′ S.

Golfo da Praia (4). Perhaps the Bahia das matilhas, with its red cliffs, 14° S.

Monte Negro (6). The dark-coloured Morro do velho, or Old Man peak, with islets to the south of it, 14° 23′ S.

Terra fragosa, Rugged land (2, 3), and *Terra parda*, Dark land (6), are descriptive terms applied to the country between the Morro do Velho and the Golfo das Aldeas.

Cabo do Leão, Lion cape (3), *Rio certo*? (3), *Cabo Zorto* (2), and *Cabo verde* should be along this part of the coast.

Monte negro, Black mountain (2, 3, 5, 7, 8), upon which Cão set up his third pillar, is now known as Cabo negro, and bounds Port Alexander in the north, 15° 40′ S.

Golfo or **Angra das Aldeas**, Bay of the Villages (6, 7, 8), which I believe to be identical with the *Golfo do Salto* (4). Here are—

Castello primeiro (7), the wall-like cliffs south of the Coroca river;

Punta de areia, Sandy point (6), now Bateman point; and

Punta dos baixos, Shoal point (4), the point opposite the Dormer bank.

Punto do Moço, Young Man's point (4). Now Albina point.

Golfo da balea, Whale bay (2, 5), or *Golfo das areias*, Sandy bay (6, 7). The Great Fish bay.

Manga das areias, Sandy sleeve (8). Tiger peninsula, in 1778 still an island.

Ponta das pedras, Stony point (8), and *Montanha da pedra*, Stony hill (6). The Monte Vermelho near south extremity of Great Fish bay, 16° 50′ S.

Praia verde, Green beach (2, 7). The mouth of the Cunene, 17° 15′ S.

Cabo preto (4) or *Cabo negro* (6, 8). Now Cabo frio, 18° 23′ S.

Serra de S. Lazaro, December 12.

Punta da Pedra, Rock point (7). Fort Rock point, a white block of granite.

Punta delgada, Point Slender (4). Rock spit, a sandy tongue.

Praia de Bragança (5). A João de Bragança was Moço do monte (chief forester) in 1494.

Angra de Ruy Pirez (8). Off Uniab river, 19° 50′ S.

Punta de Ruy Pirez (6). Palgrave point, 20° 31′ S.

Angra pequena de S. Amaro (8), September 2. Ogden harbour, described by Captain Morrell in 1832, but now non-existent, 20° 57′ S.

As areas, the Sands (8). Applied to sandhills along coast.

Praia das neves. Snow beach, of later maps, supposed to have been given to the sandhills because of their whiteness, but evidently a misprint for *Praia das nevoas*, the Shore of Mist, as Homem has it, a very appropriate designation.

Golfo da Baleia, Whale bay (2, 4, 6). Cape Cross bay.

Cabo do Padrão (2, 4, 5, 6). Where Cão set up his last pillar; now Cape Cross, 21° 50′ S.

Praia das Sardinhas, Sardine shore (2). Sierra bay.

Serra parda (2, 3, 4). The Cabo dos Farilhões, dark and rocky, in the midst of sandy dunes, 22° 9′ S.

Terra de S. Barbara (6), December 4. The country to the south of Cape Cross.

Praia das Pedras, Stony beach (7, 8). Now Rock bay, 22° 18′ S.

Praia das alagoas (6), or *Praia verde* (7). Lagoon or verdant shore at the mouth of the Swakop, 22° 42′ S., marked by dense green foliage. Three small lagoons are just within the bar.

Praia das aves (6). A very appropriate name for a coast abounding in bird-life.

S. Ambrosio (7), April 4. Perhaps intended for the Swakop.

Golfo de S. Maria da Conceiçao (6, 8), or *Angra da temeridade* (7), is our Walvisch bay.

Cabo do Espiritu santo (2). Now Pelican point, in 22° 54′ S.

Golfo da Baleia, Whale bay (2, 8), or *Porto do Ilheo* (7). Sandwich bay, 23° 21′ S. The island which formerly sheltered this bay may have grown, in course of time, into a spit of sand, an evolution not at all rare along the west coast of South Africa.

Praia das alagoas (7) may refer to the lagoon at the head of Sandwich bay, or to the mouth of the Kuiseb, which enters Walvisch bay.

Areias gordas (5), "Hell." An appropriate name for the sandy waste to the south.

Rostro da Pedra, the "Rocky beak" (4, 9), I believe to be Hallam's Bird island, in 24° 37′ S. The *terra da Roca* (6) faces it, and is also called *terra das baixas* (8), from the shoals close by.

Golfo de S. Thomé (6, 7), December 21. The bay or indentation to the north of Mount Sylvia, 25° 5′ S.

Calheta dos tres Irmãos, "Three Brothers creek" (6, 7), are the three Easter cliffs, separated by small indentations, 25° 25′ S.

Enseada pequena, Little bay (8), seems to be known also as *Golfo de S. Antonio* (7), and

there is little doubt, to judge from the description given by (8), that it is identical with Spencer bay and Mercury island, 25° 43′ S.

Golfo de S. Maria da Victoria (4, 5, 6) is evidently named in honour of the famous victory of Aljubarrota, on August 14, 1383. As placed on Cantino's chart, I should identify it with Hottentot bay, 26° 8′ S., but on Juan de la Cosa's and Dr. Hamy's charts it is associated with the *Angra* or *Golfo das Voltas*.

Ponta dos Ilhéos (6, 7, 8). An appropriate designation for the cape facing Ichabo I., in 26° 17′ S. Here also might be found the *Angra dos Ilhéos* of De Barros. On Diogo Homem's chart (1558), a pillar stands to the north of this point.

Golfo de S. Christovão (6), July 25, we believe to be the bay absurdly called Angra pequena on our modern maps, notwithstanding that it is the only large bay along the whole coast from Great Fish bay to St. Helena bay. It is identical with the *golfo* or *Angra das Voltas* of (4, 5, 7 and 8) (see note *, p. 645).

Punta da Angra (6), is Angra point of modern maps.

Cabo da Volta and *serra parda* (2), where stood the padrão of Santiago, is now known as Diaz point, 26° 38′ S.

Ilhéos dos baixos (4, 6). Halifax and other islets to the south of Diaz point.

Golfo de S. Estevão (5, 7), December 26. Elizabeth bay, 26° 52′ S.

Ilhéos seccos (4, 7). Possession and other islands further south. The *Ilhéo do pantano*, "Swamp island," of Germanus should be one of these.

Terra de S. Silvestre (6), December 31.

Volta das angras (2), fairly suits the modern Cape Volta in 28° 42′ S. Its latitude nearly agrees with that assigned by De Barros to his *Angra das voltas* (viz. 29° S).

Terra dos bramidos (4, 6). The coast to the south of Orange river, where the heavy swell causes a continuous roar (*bramido*).

Serra or *Lombada da Penha*, ridge or summit of the rock (6, 8). Vogel Klip, 29° 40′ S., 4300 feet. For "Serra de perétal" (7) we ought probably to read *Serra do penedo*, which means the same.

Morro de pedra (4, 8). Roodewall, a red cliff, 30° S.

Rio do Infante. Apparently named after João de Infante. The earliest record of the name I find in the *Repertorio dos Tempos* of 1521. It is the Olifant river, 31° 42′ S.

Serra dos Reis (47), January 6. Olifant Bergen, 32° 10′ S.

Angra de S. Helena (6, 7, 8). The bay discovered by Vasco da Gama.

Porto de S. Lucia (5). Now Saldanha bay.

Ilha branca, White island (5). Now Dassen island.

Punta da Praia (8), Green point, Table bay.

Pico fragoso (3). Now Table mountain.

Cabo de boa Esperança, Cape of Good Hope, 34° 22′ S. Supposed to have originally been named Cabo d'El-Rei (see p. 648).

Golfo dentro das serras, Gulf within the Mountain Ranges (2). Now False bay.

Ponta de S. Brandão (6, 8), May 16. Our modern Cape Agulhas, 34° 49′ S.

Gulfo das Agulhas (6). A bay to the east of the preceding, now Struis bay. See also note, p. 647.

Cabo do Infante (5, 6, 7, 8). Still known in a corrupted form as Cape Infanta, 34° 28′ S.

Rio da Nazareth (4, 5). Now Breede river.

Rio dos vaqueiros, River of Cowherds (2, 5). It is called Rio della vacche by Martellus Germanus, and corresponds to our Gouritz river, 34° 20′ S.

Cabo das vaccas (8), or *Cabo delgado* (4). Now Cape Vacca.

Angra das vaccas, Cow bay (4). Now Flesh bay, 34° 12′ S.

Ponta da estrella, Star point (4). Now Cape St. Blaize, 34° 10′ S.

Terra de S. João (7), June 24 or December 27. The country to the west of Mossel bay.

Golfo dos Vaqueiros, Gulf of the Cowherds (4), *Bahia da aguada*, Bay of the Watering-place (5), or *Golfo (Angra) de S. Braz* (6, 7, 8). Now Mossel bay.

Serra de S. Lazaro (5), December 17. Western Outeniqua mountains, rising 5000 feet.

Ponta da Pescaria, or Fishery point (7). Gericke point.

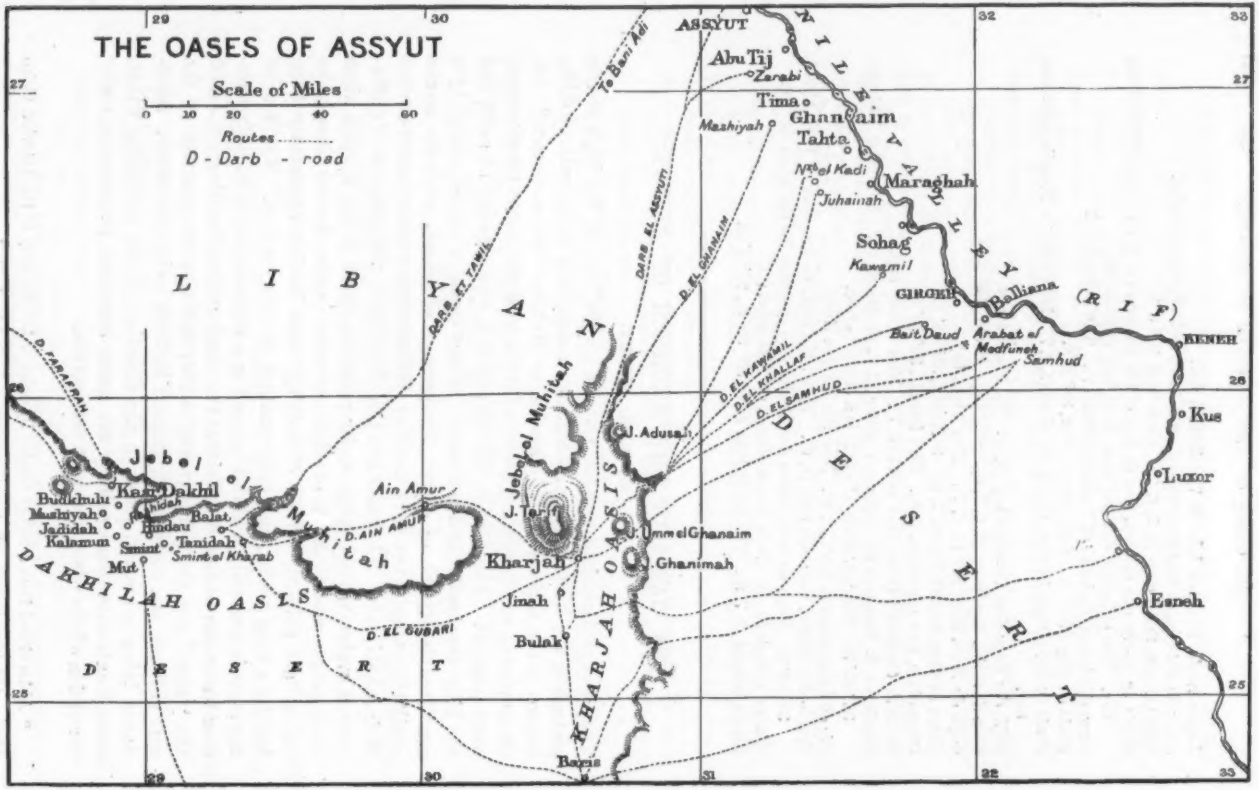
Lago cerrada, Enclosed lake (6, 7). Zwarte vlei.
Serra da Estrella, or Star mountains (5, 6). Now Outeniqua mountains.
Cabo talhado, Steep cape (2, 5, 6, 7). Cape Seal, 34° 6′ S.
Bahia or *Angra das alagoas*, that is, Bay of the Lagoons (6, 7, 8). Now Plettenburg bay. The old name does not seem to be very appropriate.
Terra das trovoados, Land of Thunderstorms (7). The Langekloof.
Ponta de Ruy Pirez (5). Seal corner point, 34° 2′ S.
Ponta (golfo) das queimadas, Forest fire point (5, 6, 7). Now Cape St. Francis and Krom bay.
Golfo dos Vaqueiros, Cowherd bay (2, 5). St. Francis bay.
Cabo do recife, Reef cape (5, 6, 7, 8). Still Cape Recife, 35° S.
Golfo da Roca, Rock bay (5, 6, 7). Now Algoa bay.
Ilhéos da Cruz, Cross islets (6, 7, 8). St. Croix, 33° 48′ S.
Ilheos chãos, Low islands (6, 7, 8). Bird islands, 33° 50′ S.
Ponta do Carrascal, Green Oak point (6, 7). Now Woody cape.
Padrão de S. Gregorio, St. Gregory's pillar (2, 5, 6), March 12. Now cape Padrone, 33° 45′ S. The "S. Georgo" of (2) is a clerical error.
Rio da lagoa, Lagoon river (5, 6). Now the Kasuga river.
Penedo das Fontes, Fountain rock (4, 6). Now Ship rock, to the west of Port Alfred, 33° 38′ S. Pacheco uses Penedo das Fontes as a synonym for the Ilheo da Cruz.
Ilha do Infante (2, 4). Now Three Sisters, off Riet point (?).
Rio do Infante (6, 7, 8). The Great Fish river, 33° 30′ S., 27° 8′ E.

THE OASES OF THE MUDIRIEH OF ASSYUT.*

By A. R. GUEST.

THE oases of Dakhilah and Kharjah lie at the foot of the high sterile plateau of the Libyan desert, which here ends in a steep wall of cliffs, known to the natives as El Muhaita, or Muhita, "the enclosure." On the south and south-west the ascent of the land to the desert level is much more gradual. There is in this direction a vast amount of sand, and the hills are smaller and scattered. The two oases are separated by a considerable stretch of desert, the passage of which, with the means available, occupies two days, and there is scarcely any intercourse between their inhabitants. The oases owe their fertility to the presence of underground water, which, being under pressure, comes to the surface when borings are made. Most of their artesian wells, known locally as "ains," are ancient, the art of making them having apparently been lost for a long period, and only resumed in this century. The floor of the oases is generally undulating, and as a rule the soil is fertile wherever water can be found. Neither the small strips of cultivation round the "ains," nor the palm-groves, which indicate the position of the rare villages, are, however, prominent features in the landscape. Sand-dunes, lying north and south in the direction of the prevailing winds, occupy extensive areas. Many are quite bare, and, progressing under the action of the wind, are most destructive.

* Abbreviated from a report printed by order of the Ministry of the Interior, Cairo 1900. The illustrations are from photographs by Dr. B. Moritz.


THE OASES OF ASSYUT
Scale of Miles
0 10 20 40 60
Routes .....
D - Darb - road
ASSYUT
Abu Tij
Zarabi
Tima
Ghanaim
Mashiyah
Taht
Nag el Kadi
Maraghah
Juhaimah
Sohag
Kawamil
GIRGEH
Balliana
(R I F)
Bait Daud
Arabat el Medfuneh
Samhud
BENEH
Kus
Luxor
Esneh
NILE VALLEY
LIBYAN DESERT
To Beni Adi
DARB EL ASYUTI
D. EL GHANAIM
DARB EL TAWIL
D. FARAFRAH
D. EL KAWAMIL
D. EL KHALLAF
D. EL SAMHUD
Jebel el Muhitah
J. Adusah
J. Ter
J. Umm el Ghanaim
J. Ghanimah
Ain Amur
D. AIN AMUR
Kharjah
Jimah
Bulak
Baris
KHARJAH OASIS
Jebel el Muhitah
Kasr Dakhil
Budakhulu
Mushiyah
Jadidah
Kalamun
Balat
Hindau
Tanidah
Smint
Smint el Kharab
Mut
DAKHILAH OASIS
D. EL GUBARI
DESERT
DESERT
29
30
31
32
33
27
26
25
28

ER RAMLAH EL KABIR, ON THE ASSYUT ROAD TO KHARJAH.

The oases produce grain and other necessaries, but not in sufficient quantity for the support of the inhabitants, who make up the deficiency by the sale of their dates. These form their principal means of livelihood, and practically the only article of export. There are many evidences that both the population and cultivated area were once larger than at present.

The inhabitants do not appear to differ from the fellahin of Upper Egypt, but in Kharjah there is a trace of Sudanese blood, due to the former yearly passage of caravans from Darfur. The only language spoken is Arabic, the dialect in use differing somewhat from those of neighbouring districts. It is said that it employs many classical words, and a careful study of the oases dialect might throw some light on their history. The people are Moslems to a man, belonging almost entirely to the Shafii and Maliki sects. In Dakhilah, the Senussis have been established some thirty years, and as they educate the children their influence must be considerable.

The roads through the desert to the oases are broad, well-beaten tracks worn into furrows by long usage. The desert is generally hard and rocky, consisting of plain after plain separated by slight rises and hollows. In some places the road winds between rocks, or passes through heavy sand, and in these it is difficult to find the way without a guide. There is generally good going for a camel, but broken ground in each road would render it almost impassable for any kind of vehicle.

The principal traffic passes along during the date season, which begins in August and is practically over in January. During this period fellahin go in parties of ten or twenty from most of the adjacent "balads" (villages) in the Nile valley, to buy dates, which are exported principally from Kharjah. These fellahin are technically called "saffarah," while the merchants visiting the oases are called "Tujjar." Arabs from the west of the Nile valley go in small numbers to the oases as guides, hirers of camels, or traders, but there is no general migration of the Arab tribes to the oases at any season. These Arabs have few camels, and are in process of settling down to the condition of fellahin, the Bali tribe being the one which retains its nomad habits the most. It is the one which chiefly frequents Kharjah, while the Amaim go to both oases. About twenty years ago the guarding of the roads was entrusted to the various tribes, who then levied toll on each camel that passed along them. This arrangement has been abolished, but the tribes have not yet relinquished an idea of possession, and when a brigandage occurs on any road, the tribe to which its guardianship used to belong may be suspected. In addition to the Arab tribes of the adjacent provinces, the Rabayi, whose settlement is at Kardasah, in Gizeh, come down annually to Dakhilah *viâ* Farafrah. They arrive in August, bringing large numbers of camels, and returning by the Darb et Tawil to Assyut, and thence by the Nile valley to Gizeh.

A few words may now be devoted to the more special characteristics

OASIS OF KHARJAH.

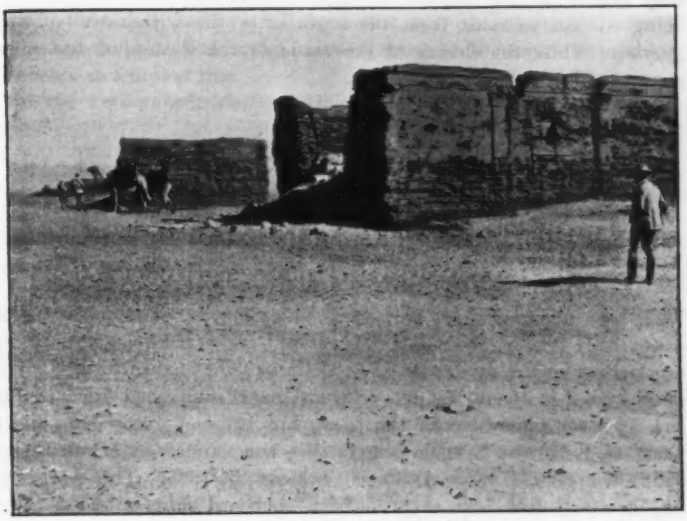
TOWN OF MUT, OASIS OF DAKHILAH.

of the two oases. Kharjah is but sparsely populated, its most striking feature being the amount of sand which chokes the valley, and which gives the impression that the oasis has been overwhelmed with sand. Ruins exist at a great distance from the present cultivation. Little boring has here been done, and the water-level has not sunk as in Dakhilah. Kharjah was known to the ancient Egyptians as "Khenem" and "Uah Ris," the southern oasis. The first name is still preserved in Ghanimah and Umm el Ghanaim, two mountains to the east of the oasis. The inhabitants still call it "Wah men Amum," obviously an ancient Egyptian name, but amongst the Arabs the common name is El Wah el Kharjah, or El Kibliyah. The principal town, itself called Kharjah, is about 130 miles from both Assyut and Esneh, but only 104 from Girgeh. From the latter it is reached by four days' marching, and from Assyut in five. Besides the date, the produce is grain and fruit, and a few vegetables. The commonest trees are the "sant" and the dom palm, the sycamore, once plentiful, being hardly known now. The "sant" are remarkably fine. Good pasture for camels is found in places, but none of these are owned by the inhabitants, goats being the most plentiful domestic animal. It is stated that some six or seven hundred camels come to Kharjah during the date season, of which about one hundred go on to Dakhilah, about a hundred also coming to Baris and returning to Esneh. These figures seem, however, considerably underestimated. In the time of the "Jallabah" or slave traders from Darfur, perhaps four thousand camels a year, belonging to Sudanese

merchants, passed Kharjah in January and February on their way to Assyut. The inhabitants are now very poor, and Baris, twenty-six hours south of Kharjah, has suffered especially since the cessation of the Sudan trade.

Dakhilah, though smaller, is more fertile and productive than Kharjah. The eastern half is very free from sand, though west of Mut dunes are frequent. The towns of Kasr, Mut, and Smint are in the neighbourhood of very extensive ruins, which evidently mark their original sites, now covered with sand. The oasis is known to the Arabs as El Wah ed Dakhilat, or El Gharbiyat. Kasr Dakhil is still its principal town, though the local government has been removed to Mut. The former is prosperous, and well supplied with water, though, as elsewhere in this oasis, the water-level has fallen. Many wells have been sunk by modern boring-machines. Kasr is the manufacturing centre of the oasis, the principal industries being pottery-making, weaving, basket-making, and the pressure of oil. The pottery is well worth attention, some of the vessels being exactly the same as those to be seen in fragments on the old sites. Balat, in the east of the oasis, is 170 miles from Bani Adi, in the Nile valley, while the distance from Kasr to Farafrah is about 115 miles, and from Tanidah to Kharjah 72. The only direct road to the Nile valley is that to Bani Adi. The productions of Dakhilah are similar to those of Kharjah, the dates fetching, however, a slightly higher price. The dom palm is very rare, though

GENERAL VIEW OF KASR DAKHIL, OASIS OF DAKHILAH.



RUINED TEMPLE, SMINT EL KHARAB.

not, as stated by Rohlfs, entirely absent. The number of camels which visit the oasis in the date season is estimated at two thousand.

The history of Kharjah and Dakhilah can be traced from very early times by the aid of the ancient inscriptions and documents, and the writings of Herodotus, Strabo, Plato, Ptolemy, Ulpian, Procopius, and the Arab geographers. Three of the latter, El Makrisi, El Istakhri, and Ibn Haukal, seem to have thought that the oases were actually abandoned at their epoch, but this would seem to be an error. What is probably true is that they had lost much of their importance by the closing of the desert roads to the west, which appear to have led to Ghanat, Fezzan, and even Marocco. According to El Masudi, Marwan, the last Umaiyad Khalif of Damascus, was slain at Abu Sir, near Mallawi, as he was preparing to proceed west to Marocco across the desert. The oldest official paper in the possession of the inhabitants which I have seen is dated 1180 A.H. A tradition quoted by Rohlfs, to the effect that the western roads were made impassable by a force of Mamluks, who stopped the wells in order to repel the raids made from that direction, appears to be demonstrably without foundation. From all we know of their history, we may deduce that the oases have never been places of great importance. That they were in a higher state of cultivation in the ancient Egyptian times than at present is unquestionable, and there is evidence that they were flourishing in the early days of the Roman emperors. It seems likely that

they shared in the decline of Egypt under the later Roman rule, being subject to raids from the south after the withdrawal of their garrison, while the closing of the roads to the west must have been a serious blow to their importance.

THE DANISH EAST GREENLAND EXPEDITION IN 1900.

By Lieut. G. C. AMDRUP, R.D.N.

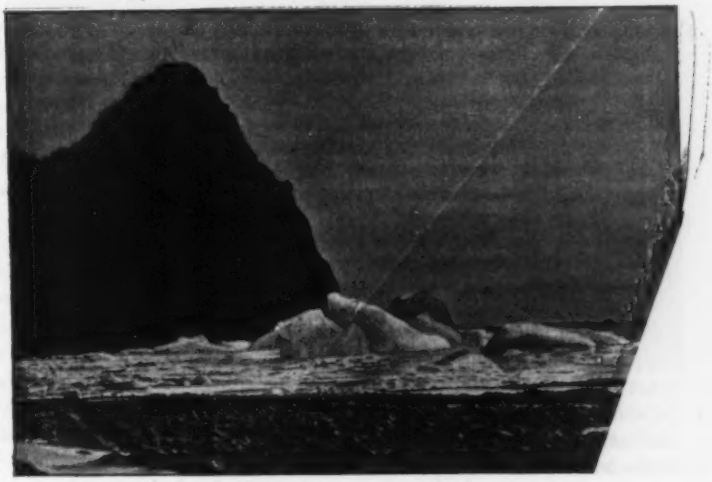
TILL 1898 no one had set foot upon the east coast of Greenland from about 65¾° lat. to about 70¼° lat. except some Eskimo, who, it was ascertained by the expedition of G. Colin in 1883–85, had formerly lived on the coast to about 67¾° lat. Several expeditions had tried to pass the ice-river which blocks the coast, but had not succeeded; one of them on board the French brig *Lilloise*, commanded by Lieut. Blosseville, disappeared, with all hands on board, in 1833. The coast from 68½° to 69° N. had been mapped from on board ship, but at a rather

SKETCH OF THE COURSE OF THE "ANTARCTIC" AND OF THE COAST-EXPEDITION IN 1900.

long distance outside the ice-barrier. The coast from 70¼° to 69° was mapped by Scoresby in 1822, and by Ryder in 1892, but in both cases from on board ship. But many miles of coast on the chart were only still shown as a dotted line.

On my first expedition, undertaken during August 16, 1898, to September 12, 1899, the coast from 65¾° to 67° 22′ was explored and mapped. The explorations were made with sledges in winter-time, and in summer-time in a light-built wooden boat, 21 feet long, manned with two naturalists and two sailors, beside myself. Two depôts with provisions were erected, one at 66° 7′, and the other at 67° 15′, and fine scientific collections were brought home.

My last expedition, which returned to Copenhagen on October 4, 1900, has from every point of view been a great success. For this expedition was bought the Swedish vessel *Antarctic*, used in the expedition of Dr. A. G. Nathorst in 1899. Besides the crew, the expedition numbered five naturalists, one army officer for mapping, one artist, and three sailors, who would accompany us on the boat expedition along the coast. The expedition left Copenhagen on June 14, and arrived at Jan Mayen on June 25, staying there till the 28th, making scientific researches and collections. The edge of the ice-pack was met with on the north-west of Jan Mayen on the evening of the 28th, and was followed north-east and north until July 6 at four o'clock in the morning, when the ice (at 74° 30′ lat., 30° 58′ long. W.) allowed us to make way towards the west. Inside the dense band of pack of smaller



CAPE GARDE, ON BLOSSONVILLE COAST.

CAPE CHRISTIANSEN, 67° 13′ N. LAT.

floe-ice now came large ice-fields, often many miles in extent, with long channels between them. On July 10 we got the first glimpse of the coast, and on the 11th, at two o'clock in the morning, we anchored at Griper Road, on Sabine island. We examined Sabine island, and found a fine collection of fossils. The depôt for Sverdrup erected by Nathorst in 1899 was found in good condition. In a cairn next to the depôt I left a record, informing Sverdrup that the *Antarctic* would stay on the coast till September 1. Then we landed at Cape Borlase Warren, and steered south along the coast to Cape Dalton (69° 30′ lat.), where we arrived July 18. South of Cape Dalton the ice was so dense that it was impossible to enter it. With three companions I left the ship here, giving the leadership of the ship-expedition to Dr. N. Hartz, and the command of the ship to the first mate.

At Cape Dalton we built a small wooden house, where all our provisions, sledges, kayaks, etc., were stored. On July 22 we left Cape Dalton, bound for Tasiusak, 65° 35′, in a light wooden boat 18 feet long and 5 feet broad, with provisions for two months and a half and a good supply of ammunition, in case we should be obliged to winter on the coast. All the outfit was as light as possible, in order that we might be able to haul the boat over the ice without difficulty. All the provisions were stowed in boxes, in such a manner that they could not sink if the boat should be crushed in the ice. But we were always in luck's way, and on September 2 we arrived at Tasiusak, having done about 500 miles in the boat. My task was done; but, in addition, I also

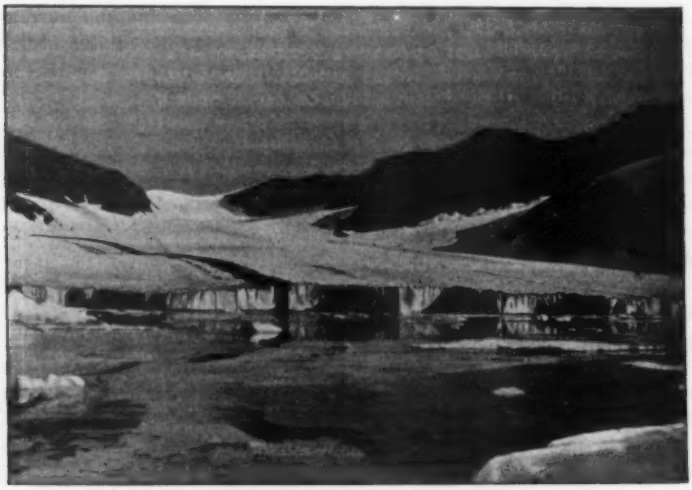
travelled along the coast for almost half a year, partly in an ice-boat, and partly with sledges, and had many exciting accidents and narrow escapes, the coast being, I dare say, one of the most inhospitable in the world, with its steep cliffs and numerous large glaciers, and with the polar ice driving with the current along the coast.

The ship expedition, under the leadership of Dr. N. Hartz, left Cape Dalton on July 22, and examined and mapped the coast to Scoresby sound. From July 1 to July 20, the expedition carried out scientific researches in Hurry inlet and Scoresby sound. Then the expedition left the sound, landed at Cape Grey, on the Liverpool coast, on July 23, and mapped and examined the bays west of Cape Gladstone. The expedition then made a short run in Davy sound and King Oscar's bay, and left the east coast of Greenland on September 1. After a short stay at Dyrefjord, in Iceland, the ship arrived at Tasiusak on September 11, when I took the leadership of the expedition and the command of the ship. We left Tasiusak on September 18, and arrived at Copenhagen on October 4.

Besides the mapping * of the coasts and bays, the expedition brought home fine palæontological, geological, zoological, and botanical collections; also a living specimen of the musk ox, and ten living specimens of the lemming (*Myodes torquatus*). Four ermines were killed and brought

VIEW FROM THE NORTH SIDE OF KAUGERDLUGSUAK.

* The new chart of the unknown coast and of the bays west of Cape Gladstone is still unfinished, and is for this reason not shown in the sketch-map.



A SMALL GLACIER EAST OF KAUGERDLUGSUAK.

home. An interesting ethnographical collection was made in the old huts and graves of the Eskimo. Especially interesting is a collection found at 68° 10′ lat., and sixteen skulls from old graves were obtained. No Eskimo lived on the unknown coast from Scoresby sound to 65° 45′ of Angmagsalik. No traces of Andrée or of Blosseville were seen. Hydrographical researches were made occasionally. Astronomical and magnetical determinations were made at many different localities on the coast.

ON THE AFGHAN FRONTIER: A RECONNAISSANCE IN SHUGNAN.*

(Notes from a Russian Officer's Journal.)

These notes are derived from the journal of a Russian officer, Lieut.-Colonel A. Serebrennikov, who was a member of one of two reconnoitring parties, despatched by the Russian Government into the little-known country of Shugnan from the Pamirsky Post during the year 1894.

The first party, of which Mr. Serebrennikov was a member, penetrated through the valley of the Shakh-Dara, whilst the second confined itself to the valley of the Gund river. Both parties ultimately united in the valley of the Kharokh river, near fort Kala-i-Bar-Panja, the capital of the Khanate of Shugnan.

This region is almost virgin ground for the explorer, most of the particulars we have of it at present being derived from hearsay. In view of this fact, and also

* Communicated by Dr. A. Markoff.

of the great probability that this hitherto neglected region may ultimately develop, by the march of political events, into a place of strategical importance, as the narrow belt of land separating two great powers—Russia and England—in Asia, it is to be hoped that the following short descriptive notes may induce some enterprising Englishman to undertake the task of exploration in a thorough and scientific spirit. This is the only excuse for offering these notes here. A military officer, whether English or Russian, on such a reconnoitring expedition has scarcely the means, if he had the will, to effect an exploration in the proper geographical meaning of the term. To get a written account at all, however sparse in detail it may be, from an eye-witness is a step in the right direction.

The first writer to mention Shugnan is the Chinese Buddhist monk Hwen-Thsang (in the seventh century); but every description, commencing with that of the Chinese traveller and ending with those of the English travellers Wood (1836), Forsyth, Trotter (1873) (in the nineteenth century), is largely made up from hearsay accounts. The first European who actually visited Shugnan *in propria persona* was the Russian Dr. Regel (1882–3). He was followed, a little later in 1883, by the mining engineer Ivanov. Neither traveller has published anything important on the country. In 1894, Lieut.-Colonel A. Serebrennikov, in the reconnoitring expedition to which reference has been made above, succeeded in riding along the entire courses of the rivers Shakh-Dara, Gund and Kharokh, and also along a portion of the Panj.*

As to the result of his travels we may now let him speak for himself.

A. M.

Pamirsky Post, Sunday, July 9, 1892.—There is a break in the monotonous run of garrison life at last! General Yonov has arrived with his staff, and after feastings, congratulations, etc., we settle down in earnest to discuss our proposed reconnaissance into Shugnan. There is no time to be lost, as we learn that the Afghans are expected almost daily to cross the river, and we must forestall them.

July 19.—Our two parties, each consisting of three officers, twelve infantry, twenty cossacks, and some guides, set out at eight o'clock this morning in a drizzling mist. We forded the river Murgh-ab after parting from and receiving the good wishes of all our brother-officers remaining behind, and also—last but not least—those of the only lady on the Pamirs, Madame S. G. Skerskaya, who had, in spite of the weather, made one of our honorary escort up to this point. The river is rather high at this season, and the waters rose to our horses' saddle-cloths even at the ford, but in autumn and winter, when its affluents are not fed by the melting of the glaciers, fording at any point is very easy.

How exceedingly monotonous and dreary the scenery on this vast Pamir plateau is! The low mountains, with vague outlines, which bound the broad river valleys, are quite bare and lifeless. In this respect how different from the awesome mightiness of some of the giants in the Alai range! But the fact which should astonish us is the tremendous height above sea-level, at which we are standing in these valleys. This, of course, cannot be seen, but only felt—fever, violent headaches, nose-bleeding, etc., are frequent symptoms here, and tell their own tale as regards altitude. The natives call these symptoms "tutek."

After passing the burial vaults of Shadjan, on the right side of the river, we turned sharply to the left, ascending a small plateau whereon are more graves, but

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* The parts of Shugnan within the valley of the Panj have lately been visited by the two Danish Expeditions under Lieut. Olufsen. On the second of these a reconnaissance east of the river was also made.

without any inscriptions. We then descended into the valley of the Kara-su river (an affluent of the Murgh-ab). In this river there is a kind of "eyot" covered with parched and sickly-looking willows, and it is strange how our eyes would affectionately cling to this anæmic oasis, which represents the sole timber growth in the Pamir highland from Fergana and the Alai to the Koi-tezek pass on the Shugnan frontier, about 240 miles.

The river now washes its way through a thick bed of conglomerate, 45 to 50 feet deep.

After crossing over to the left bank of the stream, we followed the road which brought us almost straight to the "rabat" (Persian inn) at the mouth of the river Boz-Jilga. Here we stopped for the night. More by luck than by foresight, we resisted the temptation, weary as we were, of camping in the open—for the rabat, being merely a quadrangular room with a clay dome, could not, of course, accommodate us all—and erected two of our tents outside. It was fortunate we did so, for a stiff shower fell during the night.

As a rule, the rainfall is very slight on the Pamir, and rainy days do not average more than 8–10 per annum.

We set out at daybreak next morning and crossed the summit of the Naiza-tash. This latter slopes so gently, that a carriage could easily traverse it. The road now courses between low mountains, with the usual depressing and spiritless "Pamir" perspective, which, however, opens out when we enter the Alichur valley. Here the eye can take a wider sweep, and embraces the whole of the valley, lying there as if in the palm of one's hand, with the Chatyr-tash (the tent-stone) rising in the middle, and looking really like a huge tent in the distance. A strong wind is nearly always blowing along the Alichur valley, and in our case proved very disagreeable, as we had already marched 29 miles, and were feeling tired. We camped shortly afterwards for the night about 2 miles below the Chatyr-tash on a rather marshy plain, covered with fairly good grass. Here we consulted as to our plans for the morrow.

As it was imperative that we should reach Shugnan in time to forestall the designs of the Afghan raiders, we decided to push on 18 miles next day, as quickly as possible and without halting.

Although the Alichur valley is noted for its rich grazing lands, the nomadic tribes have not yet sufficiently got over their natural fear of the Afghans to make general use of them. This warlike, though treacherous race, may be justly termed the banditti of Central Asia, and, so long as they exist, will they be a constant thorn in the sides of both English and Russians. During the summer of 1891 and 1892 they established a small military post on the eastern borders of the Yashil-kul, near Sume-tash, whence they raided and blackmailed Russian subjects on the Pamirs. It cost the Russians a very sanguinary encounter before they could be ousted from their ill-famed stronghold.

July 21.—We started at 7.15 a.m., after leaving three cossacks (as we did also at the previous halting-places) to keep up our line of communications. We again followed the road, which from this point skirts the left bank of the Alichur river, winding up and down, in and out, at the base of the mountains. The lower parts of the valley are marshy, and we had to avoid them. We crossed the stream Bash Gumbez, which falls into the Alichur further down, and passed one of the rabats of Abdullah Khan. This rabat is in very good preservation, though over three hundred years old.

A disagreeable head wind was now blowing, and we were all glad when, at four o'clock, we saw in the distance the lately-built rabat near the Mukur-Shegembet river and ravine. It stands on a high bank, and can be clearly seen a good way

off. The soil thereabouts is salt, and vegetation grows scantily only along the banks of the river.

July 22.—We set out again early next morning, after leaving our usual post of three cossacks behind. The road here turns to the left, and soon takes us away from the Alichur valley.

Our most direct route would have been along the Yashil-kul lake, thence following the Gund river, which flows out of its western side. As this road, however, is very hard to traverse, we decided to take the longer but easier route over the summit of the Koi Tezek, and thence through the valley of the Toguz Bulak river.

This we did, and camped for the night by the salt lake Tuz-kul. Here we received a deputation of a hundred Shugnanis, who petitioned us on behalf of the inhabitants of the Shakh-Dara for protection against the Afghans. They were a poor, dispirited-looking body of men, and must have stood to the Afghans as sheep to wolves. Their dress, made from the coarsest stuffs, led us to think that they were all simple peasants; but in this we were mistaken, as we soon perceived, for no less a personage than Azis-Khan, nephew of the last independent ruler of Shakh-Dara, was amongst them. This was the ruler who had been executed in Roshkala by order of the Shugnan ruler (Shah-Abduraim-Khan).

Azis-Khan, our humble petitioner, was a young fellow of about twenty or twenty-two, of medium height, with the typical features of a mountain Tajik, and the customary curly whiskers, like those we see depicted on many of the old Assyrian bas-reliefs. His dress, consisting of a black cotton "khalat," or gown, was mean in the extreme, and neither in bearing nor in apparel did he betray any hint of his princely birth. The "caste" system does not exist in Shugnan, and, owing to the general poverty which prevails throughout the kingdom, there is no visible distinction, generally speaking, between prince and pauper. Of course, there are exceptions. Later on, I met another Shugnan prince, Timur-Shah, nephew of the last Shugnan Khan, Seid-Akhbar-Shah, whose dignified bearing and manners were quite in keeping with his birth. I suppose, though, it must be hard to be dignified on next-to-nothing a year, and an empty belly will certainly humble prince as well as pauper in the long run.

We took advantage of the visit to learn something about the country, state of the roads, etc., and heard pleasant news. In the first place, it appeared, according to Azis-Khan, that the roads up to Shakh-Dara would be found exceedingly good; and, in the second place, that the inhabitants of the latter were waiting our advent with impatience, being in mortal terror of the Afghans. We continued on our way, therefore, in the best of spirits.

On entering the Shakh-Dara territory we soon had practical demonstration that, so far as our welcome was concerned, things were as Azis-Khan had represented them. We were quickly surrounded by smiling helpers, all eager to do something for us—some collecting fuel, others helping to carry the heavy loads, etc. As regards the state of the roads, however, we were disappointed, for though they may have been "exceedingly good" according to the Shugnan standard, to us they seemed exceedingly bad, even in comparison with Pamir roads.

We halted for the night near the Mazar-Kyrk-Sheit, and several of our party, having an hour or so's daylight, took advantage of it to go fishing in the stream emptying itself into the Bulyun-kul lake. Although it was the warmest season of the year (July), our thermometer only registered 10° Réaumur (54½° F.) at 9.30 p.m., and had fallen to 7° (47¾° F.) by the morning.

We started at 6.50 a.m. in fine weather. At 9.10 a.m. we reached the top of Mount Koi-Tezek (14,000 feet), which marks the frontier line of Shugnan. During

six months of the year this mountain is covered with snow, and it is then quite impassable; in the summer, however, there is no difficulty. On the very summit the road forks, the right-hand branch leading to the valley of the Toguz-bulak river, a tributary of the Gund, and the left-hand one to the Shakh-Dara valley. Here we halted, and after dividing up our baggage train our party split up, I myself being with the division which pursued the Shakh-Dara route.

We reached the Kok-bai plateau, which is surrounded by snow-capped mountains. We were now at a great altitude, many of our party suffering from incipient headache, and all were glad when the road, after turning to the left, descended along the banks of the stream Kok-bai-Chat, source of the river Shakh-Dara. Here we camped for the night, starting again at 7.15 a.m. As we proceeded, the character of the country gradually changed, and the scenery began to get more diversified. It was indeed time, for we were all heartily sick of the great "monotonous Pamir," which should furnish an ideal country for the pessimist if he is ever in want of such.

Indeed, for an image to express downright, utter melancholy, in the abstract, I cannot think of anything more apt than the picture of a pessimist reading Schopenhauer in the Pamirs. It is the "land of no hope." But although the scenery was now more cheering to the eye, this was an advantage only purchased at the expense of weary limbs, for the roads went from bad to worse. We stumbled on, however, encouraged by the sight of wild-rose bushes and the warmer-tinted vegetation which bordered our route. A wild rose is perhaps not much, in an ordinary way, to make a fuss about, but to any poor wanderer, like ourselves, whose eyes were tired and aching from the monotony of a Pamir landscape, it will appear, as it did to us, as a sign from God in the midst of the wilderness. But we still had to go through some wearisome plodding, for the road hereabouts is most precipitous. My heart knocked apprehensively against my ribs several times when my horse stumbled on the edge of some chasm or slipped in some deep rut on a breakneck descent. The best thing for a man to do in such cases is to trust implicitly to his horse; and not to attempt to control or guide it in any way, for the horse's instinct will be a surer and safer guide out of the danger than the judgment of its rider. Many a life has been lost, of horse and man, through humanity's insufferable conceit in its own prowess, and through its often ignorant contempt for the powers of that noble servant of man, the horse.

After a rough up-and-down scramble, a steep descent brought us to the confluence of the Koi-bai-Chat and the Mats. From this spot we had a truly splendid view of the distant snow-capped Wakhan mountains and the green valley of the Jaushankuz river, the latter being one of the sources of the Shakh-Dara. Of the Wakhan mountain range, two peaks tower pre-eminent, one rising to a height of 23,000 feet, and the other, the Tsaritsa Maria, to 20,000 feet above sea-level. These two majestic mountains stand adjacent and tower above all the others in their impressive majesty and might.

We soon came out into the valley of the Jaushankuz river, and thence to a place called by the Kirghiz Depchi-utun, "the trough-like." The path here became very steep and broken, but afterwards improved greatly. At this point we met ten Tajiks, who, hearing of the approach of the expedition, had come forward several versts * to meet us. Our guide, Azis-Khan, displayed much pleasurable excitement at meeting his compatriots, and when he came upon a second "welcoming party" a mile or so further on, his delight was at its height.

When they saw us, the Tajiks dismounted from their horses and took us quite

* One Russian verst = 0·6 English mile.

by surprise with the fervour of their welcome. On meeting with persons either older or of higher social grade than themselves, the custom is for the younger to take the other's hand and kiss it, to which greeting the elder responds by either kissing him on the forehead or throwing him a kiss, the whole performance being accomplished generally with dignity and grace.

The Tajiks, therefore, on meeting us ran up alongside our horses, took our hands, kissed them, and seemed to expect us to be as demonstrative as they were. It was only later on, when our interpreters had explained to them that we were unfortunate enough to have different customs, that they greeted us with hand-shakings and by making the "kulduk," *i.e.* a low reverence, performed with hands on breast.

By midday we had taken up our quarters in the tent prepared for us, and received numerous visits from Tajik-Shugnanis as well as from an influential family of Kirghiz then nomadizing in the district—that of Bai-Kurban-dakhta. In the time of the Khans, Kirghiz nomads, to the number of forty or fifty families, regularly made their homes in the Shugnan district, but now there are only about seven families there, and even those edge as near as possible to the Pamir deserts, so as to have a refuge handy against the Afghans. The latter swoop down on the higher reaches of the Shakh-Dara every now and then from Wakhan, where they garrison the fortress Kala-i-Bar-Panja, the capital of the Khanate of Shugnan.

The intervening country is very precipitous, and is icebound for three to four months in the year. Indeed, it is only the great difficulty of communication which has hitherto protected the Kirghiz from being forced under the sway of the Afghans. As it is, the latter have only thought fit to demand that the Kirghiz shall maintain a post of observation on their behalf, and inform them of everything worthy of notice—especially regarding the actions of the Russians on the Pamir.

As the entire garrison turned out and greeted us with every demonstration of friendship, their faithfulness to their charge, I am afraid, is more assumed than real. We made a halt near by the demolished Kirghiz fortress Butenek-Kurgan on the rivulet Jaushankuz (*Anglicè*, "sown barley"), formed by the junction of the Kok-bai-Chat and Mats. The name is appropriate, and not merely poetical, because, as a fact, barley-sowing actually begins here. Most probably this Butenek Kurgan, like all the others of which we have occasion to mention, was a place fortified by the Kirghiz so as to serve as a defence from their Tajik persecutors.

In the times of the khans, or, as they were called, "Shah" (ruler), these Tajik invasions were looked upon as such matter-of-fact enterprises, that even the Shah himself would not scruple to enrich his coffers by the despatch of a marauding party or two. In fact, these raids came to be looked upon as so many legitimate commercial expeditions, combining personal gain with the pleasures of war, without any of its dangers.

The Jaushankuz valley, which widens at this part, is encompassed by low mountains, quite bare, alike of vegetation and of snow. The soil, though rather marshy, is covered with a rich grass, dotted here and there with willow bushes, averaging 6 feet in height.

We started at 9.30 a.m., accompanied by an enthusiastic and increasing crowd of Tajiks and Kirghiz. The road first traversed the plain, but soon led us to a ford across the river. The latter here takes a sharp bend to the right. After crossing the river we entered a large defile, at the mouth of which stand a number of peculiar stone masses bearing a rough resemblance to Kirghiz "kibitkas" (dwelling-tents). Regarding the latter there is a legend which says that they mark the site of a former rich "aul" (village). A holy man wandered in one day craving rest and food, but the rich inhabitants, who had waxed proud in their

prosperity, repulsed him with scornful words. The holy man thereupon, angered at their shameful forgetfulness of the laws of hospitality as enjoined by the prophet on all the faithful, changed their kibitkas into stone.

On the right-hand side, we soon come to a ravine which bears the characteristic name "Duzakh-Dara" (hell's ravine). This is quite a misnomer, if the much-quoted dictum, "Facilis est descensus averni," is right, for the road which leads through this ravine is most difficult. Right opposite the ravine Duzakh-Dara, in the centre of the Jaushankuz valley, may be seen ruins of the old fortlet Jaushankuz-kala.

After ascending a small ridge a little further on, the ruins of an old Shugnan village became visible. The road then led us through a small stone ravine, and thence continued along the Jaushankuz valley again, to the junction of the river with the Vrang. From this junction, in reality, commences the river Shakh-Dara. Here we were met by the Shugnan Khudoyar, who acts as "aksakala" (governor) over Shakh-Dara, having been appointed to the office by the Afghans, when they took possession of the country.

Khudoyar is a tall, fine-looking, energetic man, with the characteristic features of the Pamir-Tajiks. Barred from any but casual intercourse with the surrounding countries by almost untraversable mountains and the neighbouring desert, the Tajiks of Shugnan were forced to intermarry among themselves, and thus to keep pure, though debilitated, their original Aryan blood. Another thing to strengthen this isolation was the fact of their being "Shiites," who are heretics, and worse than dogs in the opinion of the surrounding Sunites. Khudoyar was accompanied by a "jiguit," a tall, fine young fellow, dressed in the gray uniform of the Afghans, with bright buttons, carrying a curved Afghan sword. I could not help looking on him with suspicion, and the more I looked, the less satisfaction I got from his cunning, evil-looking face. He disappeared soon—"gone home," we were told—and that was all the information we could glean about him.

Eventually we got quite accustomed to the various uniforms, but at the beginning the sight of them raised rather uncomfortable feelings.

Having passed the ruins of the "kishlag" (encampment) Vrang, we rode along the left side of the Shakh-Dara, sometimes making our way over bare rocks which overhang the water, and sometimes through willow bushes, till we reached the ancient fortress Koi-Kuvat. According to local tradition this fort was erected 700 years ago by the Amir Koi-Kuvat; and its strategical position, built as it is on an almost perpendicular rock, was certainly very well chosen. At the present, the old fortress walls enclose several huts, "saklya," which serve as winter quarters to Kurban-Datkha and his numerous family. The surrounding country is very beautiful. The river valley broadens out, and is rich in vegetation. Here we stopped for the night.

July 24.—A beautiful summer morning. Though still early, the southern sun was so hot, that some of us sought the friendly shade of the willow-clumps, where we could tranquilly lie and gaze our fill at the beautiful landscape before us. The bright emeralds of the valley at our feet, made brilliant by the changing glow of the sunlight, and the outlines of the mountains standing out clean-cut against the blue sky, whilst the river wound its way in between, all combined to make up a picture from which we were loth to move.

When the time fixed for the halt had expired, it was very unwillingly that we rose to our feet and prepared to continue our journey.

A little further on the road passed to the right bank of the Shakh-Dara, and we had to cross a deep ford. Further on, about half a mile from Baba-Abdal-Mazar, which was agreed on as our night's halting-place, we had again to ford another

river, the Baba-Abdal, an affluent on the right bank of the Shakh-Dara. This was altogether a disagreeable business, the waters being rather deep, and the current rapid and boisterous. As if these disadvantages were not enough, the bed of the stream, moreover, was strewn with big stones, and we had several narrow escapes from accidents. We stopped on the bank of the Shakh-Dara, in sight of the burial-place of Baba-Abdal. This holy man is so revered by the inhabitants that many of those accompanying our party descended from their horses and walked past the tomb as a sign of respect. The burial-place stands on an elevation, and is visible some distance off. The exterior is quite ordinary in appearance, and the interior consists of two rooms and a terrace. Long poles stick up over the roof, hung with tails of yaks and different-coloured rags—remnants of pious offerings from the faithful.

A little lower down the slope stand the ruins of a "kishlag," by all appearance not long abandoned. We arrived at our night's camp at 11.45 a.m., and prepared for a lengthened rest, as the Tajik guides told us that the next place where we could put our horses to grass was some distance off. As the country was quite unknown to us, we had to rely entirely on the guides, which we could do with the more confidence, because it was as much their interest as ours to lead us as quickly as possible to the confluence of the Shakh-Dara and Gund, the rendezvous where our two reconnoitring expeditions were again to join. The longer they delayed, the more anxiety they would have on account of the Afghans. During the remainder of the day I visited the sepulchre, the ruins of the kishlag, and the ravines of the river Baba-Abdal.

July 25.—We started at 6.45 a.m. on our difficult journey to the first Shugnan kishlag, Seij, on the right bank of the Shakh-Dara. The difficulty and danger lay in the fact that we had to wade four times across the river, which was at rather high water. The road follows first a terrace, slightly sloping towards the river, and after passing a meadow goes through a thicket of willow trees, then ascends a slope, descends to the meadow again, enters a thicket of brushwood, and finally, $2\frac{1}{2}$ miles from Baba-Abdal-Mazar, runs close under high perpendicular rocks, which make it impossible to follow the right side of the river any further. As the ford was difficult, and would take some time, we resolved, after crossing, to wait till all the beasts of burden had arrived, and to see ourselves the most valuable bales and packages transferred safely across. The waiting would have been very dreary but for one incident, which, although rather unpleasant, served to pass the time. A pack-horse, carrying two cases of cartridges and a small barrel of spirits, slipped from the slope into the river. Through the efforts of the Tajiks, amongst whom was Azis-Khan, one case of cartridges was eventually saved, but the other sank in deep water and was lost. As regards the small spirit-barrel, that floated, and ten or twelve Tajiks immediately rushed into the water at the ford. By spreading themselves across the river they caught it, as it came down the stream. We regretted the loss of the cartridges, but the cossacks and soldiers regretted the spirits more, which had leaked out and become diluted with water. This cask was part of the very little we had remaining, hence their sorrowful looks. The crossing of the baggage and of the foot-soldiers took two hours and a half, and it was only at 10 a.m., *i.e.* after three hours and three-quarters, that we were able to continue our journey.

An hour after we had to recross the Shakh-Dara, which divides here into two streams. This made the fording easier, as, although the streams were still deep, the current was not so strong.

We halted once more amongst great thickets, "tugai," of poplars and willows. At 12 o'clock we continued our journey. The path now mounts up to

490 feet above the river, with abrupt descents and ascents, often across transversal gullies. On the left side can be seen the enormous Indich Bashur, hemmed in by precipitous cliffs, from the two clefts of which appear the peaks of the Wakhan mountains, covered with eternal snows; and below the mountains flows a small rivulet which falls into the Shakh-Dara. Right opposite the Indich Bashur, on the right side of the Shakh-Dara, there is a small kishlag, abandoned by its inhabitants, as we were told by the Tajiks, only last year. Having passed the Indich Bashur, we rode out on to a kind of level platform, where we met a fresh party of Tajiks, bearing a letter to us from the inhabitants of the lower kishlags, praying us to hasten. We now pushed on with all the speed which the difficult path would allow, and at 2 p.m. arrived at the third crossing. This proved to be the deepest, the water reaching to the saddle-cloths of our horses, besides which the bed was rough and stony. The breadth of the river here is about 60 feet. Hardly half a mile further on we had to cross again to the right side of the Shakh-Dara, but this time the ford was the shallowest and most convenient of all, and the bed quite even and firm. After this the road wends its way between enormous masses of stone, or on narrow ledges with walls so close to the rock that our stirrups grated on them as we went along. At last we began to ascend a very steep gradient on the bare rock, so steep and narrow that in some places steps had been hewn out and "balconies" constructed, *i.e.* widenings of the path by planks laid down and hanging over the precipice. We had been told about the fords, but not a word about this place, which proved to be the most dangerous on the whole road. In one place the rock wall projects so much over the ledge that our horses could not pass through, and we were obliged to carefully alight, take off the loads, and even to unsaddle the horses. Neither my companions nor myself shall ever forget this awful passage. Several Tajiks from Seij met us here, and helped us carry our luggage. Their agility, diligence, and, above all, the stamina they displayed in carrying heavy burdens weighing 144 to 180 pounds, were really wonderful. If it had not been for their help we should have been delayed here for several hours, but as it was we did it all in about half an hour.

A short ride brought us to the mouth of the river Drum, which flows into the Shakh-Dara. We halted here about 5 p.m. on a small spur jutting between these two rivers. Our hazardous journey had tired me thoroughly out, not so much physically, but on account of the strain on the nerves. I therefore postponed my inspection of the neighbourhood till the following day, and went to rest.

We were now approaching the Afghans, and had to be on the *qui vive*, especially when bivouacked, in order to guard against surprises. We had carefully chosen the position for our halt on this account, and having the water on both sides, and above us the perpendicular rocky banks of the river, 50 to 70 feet high, we felt quite safe from any night attack.

The only difficulty we were under was through the absence of green fodder, which put us under the necessity of buying hay from the inhabitants of Seij.

The night was fine and warm, with a light wind blowing up the valley. We had left our cold altitudes now, we hoped, for good. Towards evening, a band of excited Tajiks brought us the disquieting news that the Afghans were advancing in two columns from Kala-i-Bar-Panja, up the Shakh-Dara and Gund, to meet us. We had therefore to prepare for the worst.

July 27.—At 7 a.m. we cautiously set out to continue our journey. After having first crossed a rather well-preserved bridge on the right side of the Drum, and afterwards another bridge on the left side of the Shakh-Dara, the road began to ascend steeply till we at last emerged on to a small stony square place—a platform 120 to 150 feet above the level of the bridges. Higher and higher we

went, till we came out on a second platform. All traces of a road had now disappeared, and even the path was sometimes hard to trace. This was all tiring work, and having rested a few minutes, we began the third and most troublesome part of our ascent. This proved simply cruel, what path there was being covered with needle-pointed flints which were torture to walk on. We had to dismount, as the path crumbled away under the weight of our horses, and many a slip sent rocks and stones and soil rolling down the slopes. In many places the ascent was so steep that steps had been hewn in the cliff, which we walked up as on stairs. The fatigues of this ascent, in fact, transcend description. Really we had to stop every five or ten steps to take breath. In cases like this the best thing to do is to let the horse go in front, and for the man to be half-tugged up, holding on to its tail. This we did. If the ascent was so difficult for a horseman, it is easy to imagine how much more difficult it became when we had to help to drag up all our baggage. We were often obliged to unload the pack-horses and to carry the baggage over the most difficult places parcel by parcel; and even when we could load up the luggage again, the task was more often than not very dangerous on account of the narrowness of the path, bordered by a perpendicular cliff on the left and a precipice on the right. At last (at 9.45) we arrived at the summit, all of us more or less exhausted, with throats parched, and trembling all over from the strain. We could still look back and see the struggles of our companions. In one place a large load had slipped from the back of a horse to its hind quarters, together with the pack-saddle, and the horse was prancing with fright, to the danger of all surrounding it; in another place some loads had fallen down, and the "kerekesh" (guides) were struggling, some to put them on the restive horses again, others to drag them forward themselves. It is a miracle to me, however, how we managed to get through without a serious accident.

Having rested a little, we went on again, and were soon descending the slope leading to the Shakh-Dara at the spot where the river Badjan-Dara joins it. The descent is here, if anything, more precipitous than the former ascent, going down no less than 1000 feet; but, being a descent, we accomplished it without much difficulty along a path which had been specially laid out for us by Tajiks sent from Seij the day before, and to whom we had lent our spades and mattocks for the purpose. We rested at the foot amongst the enormous poplars and willows of a great "tugai" (grove), at the bottom of a deep valley surrounded by cliffs, and bearing the name of Kara-Dangue. On two sides we had the Shakh-Dara river and its affluent on the left side, the Badjan-Dara, and on the others there was the rocky declivity we had just descended. The cliffs here almost overhang the stream, and the sombre grandeur and gloom of the scene weighed heavily on all of us, so that we would willingly have chosen a more cheerful resting-place if the choice had been given us.

It was in this gloomy place that we received a letter from the chief of the Afghan detachment, then stopping at the fortress Rosh Kala, a little distance from our bivouac, literally gorgeous with all the flowers of Persian speech. To have read his compliments and the wordy welcome we received, any one unacquainted with Afghan ways would have imagined we were long-lost brethren; but as we knew that the Afghan praises most those whom he means to kill, the letter had no other effect on us than to make us exercise greater vigilance. The reader will see further on that we were right in our interpretation.

Our baggage train had not yet arrived, when darkness settled down on us like a funeral pall. A cool wind fanned us from the snowy heights of the Wakhan mountains, whose outlines were lightly silvered against the purple-black sky by the pale crescent of a young moon. Our tired men had dined hastily, many falling

asleep as they ate, and lay sprawling about in all sorts of ungainly postures. On account of the proximity of the Afghans and the obvious disadvantages of our position, we posted several foot soldiers as sentries on the ridge of the slope, which was the only place by which we could have been surprised.

In spite of my own fatigue, I could not get to sleep. The gloomy genius of the surroundings seemed to weigh on me, and the most hopeless thoughts thronged through my brain, and made me utterly miserable. "Out of the depths have I called unto Thee, O Lord!" The sombre, grand old psalm sank deep into me, and I felt a little perhaps of what our Aryan ancestors felt—fear of the unknown, the vast, illimitable nature surrounding us! Only the rhythmical gurgle of flowing water and the mournful soughing of trees rocked by the wind broke the heavy black silence. At last I fell into a troubled sleep, and when I woke again—what a relief! All was noise and bustle, and in the general hurry-scurry of my fellows I soon forgot the terrors of the night.

July 28.—A memorable day. We continued our journey at 7 a.m., and crossed the Badjan-Dara. This was comparatively easy, as the mountain-rivers rarely contain much water in the early morning. We had some more difficult ascents to get over, however. The first half of the one we now faced was not so steep but that the loaded horses and ourselves could ride up; but the second half was like a huge irregular staircase up a slightly slanting cliff. Here we experienced a renewal of our old troubles; but thanks to our men having in a measure gained fresh strength, and to the help afforded us by a number of willing Tajiks who had come to meet us, we made much better progress. We had to be careful also not to overtire our men on account of possible events.

In an old number of the journal *Razvyedchick*, I remember once reading an article on the training of German cavalry. One part described the exercises by which they were taught to ride over different obstacles in the road. Among others, I remember that one exercise was to ride "upstairs" and down. This seemed to me very curious at the time; but now, since I had had my own share of riding "upstairs" and other unpleasantness, I could not help admiring the effectiveness with which the German military code seeks to prepare their cavalry for all sorts of emergencies. It is certainly worthy of imitation by other nations.

We soon rode into a large place, from which could be seen the far-off kishlag Sendip, the residence of our titled companion, Azis-Khan.

This was a glorious day, and the scenery truly delightful after the gloomy grandeurs we had just escaped from. On account of the proximity of the Afghans we had resolved to move forward, massed together, with the baggage in the centre. While our soldiers were making the necessary arrangements I took the opportunity of taking a peep at the kishlag and the surrounding country through my field-glasses. The kishlags of the Shugnanis generally consist of a collection of a few homesteads with fields, but not grouped close together. Each family generally consists of the father, mother, and married brothers. The "saklyas" (huts) of the Tajiks are made of stones, held together with clay, and look like so many rude cowsheds. These huts often have no windows, and the doors are always made very small, several boards being roughly nailed together. Light enters through a quadrangular opening in the ceiling, which can be shut by a shield; and this opening at the same time serves as an outlet for smoke. The fireplace, "ruùz," is built against one of the walls of the hut, and the sanitary arrangements are very imperfect. As there are no windows, the huts of the Tajiks are very dark, damp, and foul. Of furniture there is hardly any, and its absence is badly compensated for by wide shelves along the walls. On these shelves the inmates sit, sleep, dine, etc. The majority of Tajiks' dwellings are

very unattractive, although one meets here and there an exception—as, for instance, that of Azis-Khan, of which the woodwork is decorated with clumsy though quaint carvings, and the walls are evenly plastered, with niches for utensils, clothes, etc. The stables, cowhouses, farmyards, barns for seeds, cellars, etc., generally adjoin the huts. We could not help especially noticing the very curious buildings called "topkhana." These are old quadrangular towers in which the inhabitants of the kishlags used to hide from the attacks of the enemy till relief came, or till the enemy got tired of waiting, or else starved them out. One often notices these "topkhanas" along the Shakh-Dara and Gund rivers. In one place on the latter there is a strong fortress, Chartym, consisting of seven such towers. The topkhanas were built generally on sites selected in the least accessible places. Of course, there was no artillery in those days, and the towers therefore generally answered their purpose very well. An entrance could only be effected through a small opening, made in the wall at such a height above the earth that a ladder had to be used. The defenders were at the top, and could fire at the enemy through embrasures.

At 8 a.m. we started. After leaving kishlag Sendip the road descends abruptly to the banks of the Shakh-Dara, and crosses an immense tugai over rather marshy soil. The trees grow so thickly here that at some places we rode through long vaults of green formed by the interlacing branches. The tugai ends just opposite the kishlag Denkent, and the road then gets bad on account of the small pointed stones with which it is strewn.

A little after one, after passing the kishlag Bar-vo-oz, we approached the kishlag Vez-dara, where it was resolved to put up for the night. As it was still early, we determined to leave the baggage train and the foot soldiers with directions for them to halt near Vez-dara, while we ourselves would go a little further on and have a look at the fortress Rosh-kala. We had been informed by the Tajiks that an Afghan detachment of about 120 to 150 foot soldiers and a few cavalry were stationed here; hence our curiosity. We only got a sight of Rosh-kala at 4 p.m. from a topkhana, after a wearisome ascent, of which we had not dreamt, having been told that the fortress was "not far."

While we were passing the topkhana we heard the ringing notes of a trumpet from the fortress, sounding quick notes resembling our cavalry signals. This was followed first by a single volley, and then an irregular fusillade from the opposite side of the Shakh-Dara. The significant "ping" of bullets splintering the rocks and stones in our path made us aware of the fact that we were the objects of these little attentions from the Afghans; but it is somewhat incomprehensible that, notwithstanding the short distance and the large target we offered, not one of us was hurt. As we had the strictest orders to refrain from using our arms, we resolved to return. We were joined by our foot soldiers at the bottom of the descent. They had been hastening towards us on hearing the shooting from Vez-Dara, thinking we had fallen into some ambuscade. On the night of July 28, our prospects of bringing our reconnaissance to a successful issue were not brilliant. We were no more than 5 or 6 miles distant from an enemy, numbering five times our men; and of what their sentiments were toward us we had just had proofs. The Pamirsky Post, from which we could obtain reinforcements, was about 180 miles distant, besides which the country was strange to us. We heard all sorts of contradictory rumours as to the Afghans; and lastly, we had not even the means for effectively defending our bivouac in case of attack, as we could only muster twelve foot soldiers and twenty cossacks. However, we did our best, and arranged officers' guard, stationed our outlook posts and despatched cossack patrols, and also parties of Tajiks to reconnoitre. The Tajiks willingly offered their

services, which we were glad to accept. The night passed anxiously for all of us. When day broke we set about doing what we could to fortify our position, and to get reliable information as to the intentions of the Afghans. How serious our position really was, may be judged from the fact that, two days afterwards, the Afghans came to within a mile from us, and several times fired at us.

With July 28 began a series of wearisome days and nights, when we expected an attack at any moment. We had meanwhile received some reinforcements, which put us on a more business-like footing, and enabled us to organize a more satisfactory defence of the camp; but, nevertheless, we were not able to breathe freely until August 13, *i.e.* seventeen days later, when General Yonov arrived with a fresh detachment of infantry and cossacks.

On the following day, early in the morning, the Afghans, having learnt of the arrival of our reinforcements, hastily retreated first to Rosh-kala, and then further back to the left side of the Panj to the fortress Kala-i-Bar-Panja. As they had destroyed in transit the bridge over the Shakh-Dara at Rosh-kala, and the full state of the river rendered fording impossible, our detachment could only move on to rejoin the Gund river reconnoitring party on August 20, by which date the bridge had been roughly repaired by the Tajiks. We were now penetrating into a country more and more under cultivation, but many of the fields had been either burnt or trodden down by the Afghans, to revenge themselves on the proprietors for going over to the Russians.

The fortress Rosh-kala, near which the detachment crossed to the right side of the Shakh-Dara, stands on a steep cliff. The south part of the cliff, which faces the river, rises to 1500 and even 2000 feet above the surrounding country. From this side Rosh-kala is quite inaccessible, but from the east and west sides it is, though with great difficulty, accessible. The north side faces the mountains on the right bank of the river, and is the weakest; but the fortress walls, made of stone, mount here to a great height. This cliff was the scene of the execution of the last independent ruler of Shakh-Dara, Mir Atam Bek, and his numerous followers, who fought for their independence against the Shugnan ruler, Abdurhaim Khan. By order of the latter these unfortunate men were precipitated from the height of the cliff and dashed to pieces on the stones lying at the cliff's base. Rosh-kala has many shelters erected for men and horses. Having taken advantage of these, the Afghans had ensconced themselves to their own comfort and convenience, and we had many bitter regrets for not having arrived before them. An immense vista of surrounding country can be seen from this cliff, and the kishlags, picturesquely scattered on both sides of the Shakh-Dara, viewed from the great eminence, look like small toys.

The nearer we approached the mouth of the Shakh-Dara, the denser grew the population, and the more comfortable the roads. The two rivers, Shakh-Dara and Gund, on joining, form the river Kharokh, which runs its course of about 3 to 4 miles, and then joins the river Wakhan Daria, thus forming the river Panj. The valley of the Kharokh is cultivated in sections belonging to different proprietors, who separate their lands from each other by small stone walls.

To get over to the right side of the Kharokh one has to cross the Gund by a bridge situated a few thousand yards from the place where the Gund joins the Shakh-Dara.

Having joined the Gund reconnoitring expedition here, the whole detachment took up its position in several gardens 2 or 3 miles from the mouth of the Kharokh, and remained here until September 15, waiting for further orders. The interval was spent in reconnoitring the country, also the roads down the Panj to Roshan, and to the locally celebrated ruby-mines; and also in studying the Tajiks,

their ways of life, and the numbers of the population in Shugnan, etc. The position we occupied in the valley of the Kharokh offered many conveniences, and if at some future time we should have to maintain a garrison in Shugnan, and to erect a fortified position there, this place should undoubtedly be chosen.

About 3 miles lower down the Panj, on the left bank of this river, stands the fortress Kala-i-Bar-Panja, the capital of Shugnan, which is also known as Ak-kurgan on account of the white (*ak*) cliff on which the fortress walls stand. These walls, as also the greater part of the interior of the fortress, can be easily seen from the right side of the river, as they stand within rifle-shot of the mountains. This latter fact nullifies the importance of Kala-i-Bar-Panja as a strategic position.

On the right (Russian) side of the Panj are about fourteen kishlags. The whole country is rather densely populated, and the inhabitants are fairly well-to-do. The climate is so mild that even vines grow here, and are cultivated by the Tajiks. A nearer acquaintance with the Tajiks, and the study of their customs and manners, forces us to sympathize with this persecuted nation, which has gone through so many trials. Indeed, it is a wonder how it is they have not disappeared from the face of the earth. In far-off times this nation turned their eyes towards the north, to the Russians, and waited patiently for the occasion when they might become subjects of the great white Tsar, and thus free themselves from the persecution of the Afghans. This desire to be under Russian government, which was one of the principal reasons why the Afghans persecuted them, did not weaken as time went on, notwithstanding that their hopes were not soon realized. With the appearance of the Russians on the borders of Shugnan in 1894, it seemed that the end of their miseries had come, but fate has once more mocked their hopes, for, as we could not gain permission to leave even a small garrison to winter in Shugnan, we had to return. This we did *viâ* the Gund valley on September 15, followed by a great number of Tajiks and their families. The latter were forced to migrate in anticipation of revengeful reprisals from the Afghans, which would undoubtedly follow their having extended such a friendly welcome to us.

The general character of the road in the Gund river valley is the same as in the Shakh-Dara river valley, but the river is impassable, and the inhabitants have therefore been obliged to erect bridges in several places. Our detachment soon arrived at the summit of Koi-Tezek and re-entered the inhospitable Pamir, and on September 24 reached again the Pamirsky Post from which it had started.

THE MONTHLY RECORD.

EUROPE.

The River System of North Wales.—An attempt has lately been made, in an article contributed by Mr. Philip Lake to the *Geological Magazine* (May and June, 1900), to elucidate the origin of the river system of North Wales, on the lines so successfully followed by Mr. Marr in reference to the English Lake District. The writer begins by a study of Bala lake (sounded by him in 1899) in its relation to the neighbouring valleys, showing that the discharge of the lake into the Dee is not what the general topography of the district would lead us to expect. The lake lies, in fact, not in the valley of the upper Dee, but in the well-defined valley which runs north-east from Barmouth to the town of Bala, and is shut off from the vale of Edeyrnion (the Dee valley between Llandderfel and Corwen) by a ridge of hills traversed by the gorge in which the Dee now flows. That the drainage of the district once flowed continuously from north-east to south-west, past the site

of Bala lake, into the valley of the Wnion, is indicated also by the apparent slope of the lake-floor in that direction, and by the existence of an extensive alluvial plain at the present foot of the lake, even larger than that now being formed at its head. Mr. Lake shows that in the direction of the Wnion valley there is no evidence that the lake is rock-bound, but that the old channel was probably blocked by drift, the reversal of the drainage being due, however, in part, to Earth-movements. The lake and valley adjoining it to the south-west lie in a trough between faults, which seem to have played an unusually important part in the production of the present topography, the present low watershed across the valley corresponding in position with other, oblique, faults. Passing to the consideration of the general drainage system of North Wales, the writer draws attention to the important series of deep valleys running for long distances from north-east to south-west, although interrupted, in certain cases, by low watersheds. The most marked of these lie on a straight line running from Ogwen lake to the head of the Wnion valley, and their position is probably due to Earth-movements. The valleys referred to cut up the whole country into parallel strips drained (generally southwards) into those valleys by another system of streams, the units of which can frequently be traced from one strip to the next, and which appear to represent a former drainage system, radial in character, having its centre near the sources of the Conway. This system—very similar to that now in existence in the Lake District—seems to have been subsequently modified by the formation of the present transverse valleys, in one of which Bala lake was formed.

Influence of Latitude on Plant-life in Germany.—Prof. Ihne, of Darmstadt, who has paid much attention to the phenomena of plant-growth as influenced by locality, and has superintended a careful series of observations in Germany for the purpose of elucidating the question, sets forth, in the seventh number of the *Geographische Zeitschrift*, the results obtained as regards the influence of latitude on the dates at which spring is announced by the bursting into flower of various typical trees and shrubs. By the method adopted, which is described at the outset of the paper, the first appearance of the leaf (though recorded in the observations) has not been taken into consideration, owing to the greater difficulty of obtaining a trustworty record of this than of the dates of flowering, while, given careful observation, the results arrived at may be taken to be the same. Mathematical accuracy is, of course, not to be expected, and the results as a whole are not invalidated by the impossibility of selecting stations at which observations for a sufficient number of years have been carried out, and where other factors besides latitude—longitude, altitude, exposure, soil, etc.—are the same. In his present investigation, Prof. Ihne has chosen localities differing as little as possible in these respects. All lie more or less in a line from north to south, the average difference of longitude being only 46 kilometres (28½ miles); and from his previous researches into the influence of longitude on the phenomena in question, which showed that for stations of moderate elevation in Central Europe, the advent of spring is retarded by 0·95 day for every 111 kilometres (60 geographical miles) in an easterly direction, Prof. Ihne shows that such a difference may well be left out of consideration. From the differences observed in the case of eight pairs of stations, which, when reduced to the unit of 1° of latitude (111 kilometres), show intervals of time for that distance varying from 3·4 to 4·6 days, Prof. Ihne arrives at the conclusion that for every additional degree of latitude the advent of spring is retarded by about four days.

ASIA.

Burma-Sechuan Railway Survey.—Among the many railway projects set on foot within the past few years for the opening up of China, one of the most

important from the point of view of Great Britain is, as is well known, that for a line from Burma, in continuation of the railway already constructing to the Kunlong ferry on the Salwin, through Yunnan to the province of Sechuan, the wealth of which it is hoped to tap by this means. A survey of the proposed route was carried out about eighteen months ago on behalf of a British syndicate—"The Yunnan Company"—by Captain Davies and Lieut. Watts-Jones, working from the side of Burma, and Captain E. C. Pottinger starting from the Yangtse river. An account of his survey was given by the latter officer in February last at the Royal Artillery Institute, in the *Proceedings* of which body (April, 1900) a report of the lecture appears. Captain Pottinger was assisted in the work by Lieut. Hunter, R.E., and, until his death at Chungking from inflammation of the lungs, by Mr. L. Tucker, son of General Tucker, now in South Africa. Two native Indian surveyors also accompanied his party. During the voyage up the Yangtse, Captain Pottinger executed a survey of the rapids, while the surveyors landed frequently and sketched in as much as possible of the adjacent country. The serious work of the expedition began, however, only after arrival at Chungking, when it became necessary to decide on the line to be surveyed from the Yangtse to Yunnan-fu. The intervening country is exceedingly difficult, and the general consensus of opinion has hitherto been that it would be quite impassable for a railway. By the principal trade routes, the shorter of which reaches the river at Sui-fu, this seems to be the case, and even the telegraph route which starts from Lu-chao presents great difficulties, rising abruptly from 1000 to 5000 feet, falling to 2000, and again ascending to 8000. Tunnelling is out of the question, as what appear to be mountains are in reality the escarpments of tablelands, while the rivers often run in corkscrew gorges, with a drop, in places, of 500 feet in half a mile. However, by leaving the main road and exploring the adjacent country (of which existing maps are in places 40 miles out), Captain Pottinger at last found what he considers a practicable route. A tributary of the Yangtse was followed up as far as Yung-ning, beyond which the whole country begins to rise rapidly, the formation changing from sandstone to limestone, with coal outcrops all over the hills. The country becomes very irregular and broken, rivers and streams flowing in deep limestone gorges, disappearing underground and again emerging in the most confusing manner. There are many blind valleys and hollows, the drainage water escaping underground, and even from hill summits it was often impossible to estimate accurately the run of the rivers and ranges. Captain Pottinger was much struck by the absence of timber, every tree and shrub having been destroyed for firewood, so that stalks of poppies, sedges, etc., are now dried and used for that purpose. The people are, however, beginning to appreciate the advantages of coal. Bamboos are grown in the villages and used for all building purposes. In the mountains some of the Miao-tzu aborigines were met with, the women still retaining their tribal costume, though the men wear Chinese dress and are rapidly losing their original characteristics. The Burma party was finally met at Weining, and the main object of the expedition was completed. Captain Davies returned *viâ* Tongking, while Captain Pottinger and Lieut. Hunter worked their way back to the Yangtse by different routes, surveying as large a tract of country as possible. During the four months spent in the hills there had been hardly twenty days without rain.

Himalayan Ascents.*—In their recently published volume, Dr. and Mrs. Workman give a personal narrative of two summers' travel among the peaks,

* 'In the Ice World of the Himalaya.' By Fanny Bullock Workman and William Hunter Workman. London: Fisher Unwin. 1900.

passes, and glaciers of the Western Himalayas, with a brief account of an abortive autumn expedition into Sikkim. In the first season, 1898, the travellers cycled to Srinagar, which they made their starting-point for a tour among the mountains of Ladakh, Nubra, and Suru. In 1899 they adopted a more ambitious programme, securing the services of the well-known guide, Mattia Zurbriggen, and accomplishing some pioneer ascents in Baltistan, in the vicinity of Askole, near the foot of the Great Biafo glacier. The peaks ascended varied in height from 18,600 to nearly 21,000 feet, and the difficulties encountered taxed all the energies of the travellers, experienced mountaineers as they were. The authors regard as a complete delusion the idea that, apart from their altitude, the Himalayas are easy mountains to ascend, giving it as their opinion that many of the peaks will never be scaled by any creature without wings. The book makes no pretensions to scientific value, but the views and descriptions give a good idea of the sublime scenery of the snowy Himalaya, while Dr. Workman's remarks on the physiological effects of high altitudes are of some interest. Some additions to and rectifications of the maps were made, especially by the discovery of a large crescent-shaped glacier south and west of Mango Guzor, the highest of the peaks ascended. In the absence of native names for the features described, the travellers have given to these names of their own, which are not always felicitous. The appellation Siegfriedhorn, bestowed on one of the peaks ascended, sounds decidedly out of keeping with its surroundings. The explanations of Indian terms given in a short glossary are in several cases inadequate, if not misleading.

The Trade of the Persian Gulf.—The report for 1899, by Lieut.-Colonel Meade, on the trade of the Persian gulf, records an improvement as compared with 1898, though less than had been anticipated, owing to failure of rain towards the end of the season. This affects the export of cereals, on which the trade of the region largely depends, and which will have assumed larger proportions during the present year, as an abnormal harvest was expected. At most of the Persian gulf ports India heads the list, both of imports and exports, while, except at Bushire, the direct trade with the United Kingdom is but small. Apart from local trade, the only other countries having any large dealings with the Persian gulf are China, which takes opium from Bushire to the value of £285,000; and Turkey, whose trade is principally carried on with Bahrain. From that port pearls were exported in 1899 to the value of £454,900, as compared with £299,500 in 1898; and from the Arab coast ports to the value of £516,600, as compared with £343,700 in the former year. As regards shipping, Great Britain still practically holds the monopoly in the gulf, that of all other European nations being quite insignificant. Turkish shipping is represented principally at Bahrain and Bushire, while the trade between the Arab coast and Persian ports (principally Lingah) is chiefly carried on by Persian vessels. The rest of the local trade is mainly in the hands of Arab and Muskati owners. The report of the Vice-Consul at Mohammerah announces the re-opening of the direct trade-route from the Karun to the north of Persia, and also the completion of the new Ahwaz-Ispahan mule road, so that an increase of trade by the Karun—which in 1899 showed a falling off—may now be expected.

Map of Afghanistan: Correction.—In the map of Afghanistan and Baluchistan published in the November number of the *Journal*, the Russian railway from Merv to the Afghan frontier is made to terminate at the Jamshidi capital Kushk. This is an error. It terminates at the Russian station of Kushk, which is on the river of that name, at (or near) the point where the river intersects the Russo-Afghan boundary. The two places are quite distinct, and it is unfortunate that they should be called by the same name, although doubtless the Jamshidi Kushk has long been overshadowed by the Russian settlement.

Cession of Spanish Islands to the United States.—By a convention signed in Washington on November 7, the small islands of Cagayan Sulu and Sibutu off the north of Borneo, which had remained in possession of Spain, are made over to the United States in consideration for the payment of $100,000. The islands formed the last remnant of the Spanish empire in the far East.

The Khotan River.—In Captain Deasy's paper, p. 513, *antea*, the title of the illustration should be the *Sources*, not the *Sands*, of the Khotan river.

AFRICA.

The Blanchet Expedition: Death of the Leader.—The fuller details now received respecting the detention of M. Blanchet and his European companions on the borders of Adrar (*ante*, p. 227) give the affair a somewhat different complexion from that suggested by the first reports. The travellers received throughout the cordial support of the King of Adrar, Moktar uld Aida, who did his utmost to protect them during the disturbances which led to the flight of the French escort. After a virtual captivity of over two months, the steps taken by the French authorities to secure their release proved successful, and the expedition returned to St. Louis at the end of September. We regret to state, however, that M. Blanchet almost immediately (October 6) succumbed to yellow fever contracted during the journey to Dakar. A short preliminary account of the journey, to which we hope to recur shortly, appears in the new number of the *Annales de Géographie*.

The Northern Territories of the Gold Coast.—This name has been given officially to the latest territorial acquisitions in the Gold Coast Protectorate, lying north of Ashanti roughly between 8° and 11° N. lat. A large amount of information on these territories—a *terra incognita* until quite recent years—has been collected by officers of the administration, but little has hitherto been published. The recent issue by the War Office of a report, compiled by Lieut.-Colonel H. P. Northcott, in which the information so collected has been embodied, is therefore particularly welcome. It begins with a clear sketch of the geography of the territories, which lie wholly outside the belt of forest which extends about 200 miles from the coast. They form a gently undulating plateau, gradually rising northward from Kintampo and ending abruptly in a scarp facing north and falling very steeply about 700 feet, through a break in which the White Volta passes in its southward flow. North of the scarp is another plateau of a character similar to the first, but rising frequently into definite hills from 100 to 500 feet in height. The whole area is covered with coarse rank grass, burnt down annually, and dotted over with dwarfed and shadeless trees. The absence of large trees is probably due to the fires, for nearly every village possesses its "shade tree" (baobab, cotton, etc.), where are held the market and village parliament. The main river-system is formed by the Black Volta and White Volta, the former of which has no important affluents, the latter only one—the Kulpawn. These carry running water all the year round, and for four months are noble streams, but at the end of January they shrink to modest dimensions. During the dry season a scarcity of water is experienced in many parts. The basis of the soil is sandstone, covered in the lower levels with a thin layer of alluvium. In the hills granite and quartz are found. The report contains some account of the history of the native kingdoms of the territories, the principal of which is Mamprusi. This seems to have been founded by one Tosogo, who came west from Gurma about the beginning of the century, and conquered, besides, Moshi and Dagomba, which he placed under his brother and nephew respectively. Until recent years, a yearly present was made to the king of Mamprusi by the king of Moshi, whose election had also to be confirmed by the former. The lesser states of Wa, Bole, and Daboya seem to

have formed parts of the former kingdom of Yabum. The main trade of the region consists in the exchange of the cattle and sheep of the north for the kola-nuts of the south. There is some demand for European articles, and satisfactory results have followed from the establishment of Government stores at Wa and Gambaga, at which all payments are made in British currency. In the rainy season the White Volta would probably be navigable throughout the great part of its course by stern-wheel steamers, there being apparently only two sets of rapids forming a bar to navigation. The most important link in the chain of communication from the coast will be the proposed railway from Accra to Pong on the Volta, but motor cars, for which 70 miles of suitable road already exists, might prove of much value as a means of transport. Experimental gardens are needed to test the capability of the country to produce paying crops. The climate is appreciably better than on the coast, for though the heat is great in March, April, and May, the air is free from the oppressive moisture of the more southern districts. The report includes extensive vocabularies of the principal languages of the country. The map, which is based principally on the valuable work of the late Mr. Ferguson, shows the administrative subdivisions of the territory.

Organization of French Congo.—By a decree dated September 5 last, the northern territories of French Congo have been formed into an administrative province entitled "Territoire militaire des Pays et Protectorats du Tchad." This includes, firstly, the basin of the Kemo, a tributary of the Ubangi; and, secondly, the basin of the Shari and its affluents (excluding concessions already made), as well as the countries included within the French sphere by the Anglo-French conventions of 1898 and 1899, *i.e.* Bagirmi, Wadai, and Kanem. All these territories are placed under a commissioner, subordinate to the commissioner-general of French Congo. The latter functionary has under his immediate control all the territory of French Congo not included in the new province.

The Lemaire Expedition.—Captain Lemaire, leader of the Belgian Scientific Expedition to the Southern Congo basin, which left the mouth of the Zambezi in 1898, arrived on September 3 last at the mouth of the Congo, having effected the twenty-third crossing of Africa hitherto made in a little over two years. Some additional details respecting the geographical work done along the Congo-Zambezi watershed, with a map showing the routes followed, are given in the *Movement Géographique* for October 21 and 28. Captain Lemaire's Expedition from Lofoi, on the Lufira, to Lake Dilolo, was commenced on June 28, 1899, and on the return journey the watershed was followed with few intermissions from 22° to 27° E. long. (in part in company with Major Gibbons), being crossed no fewer than twenty-five times. The most important correction introduced into the map as regards the position of the watershed is its shifting to the north by more than a degree between the meridians of 24½° and 25½ E. As is pointed out by M. Wauters, the stream crossed by Capello and Ivens in 25½°, and taken by them to be the source of the Lualaba, must in reality bend back towards the Zambezi system, which thus receives a considerable northward extension. The sources of the Kapombo (Kabompo) and Lunga (not to be confounded with the Lunga of Capello) were found by Captain Lemaire to lie in about 11½° S. After the return to Lofoi, the expedition made its way by Mpweto to Lake Tanganyika, which was reached at Baudoinville on April 7 last. During his stay on the shores of the lake, Captain Lemaire took a series of astronomical observations which confirm the results gained by Mr. Fergusson, the surveyor attached to Mr. Moore's expedition. At Towa, the shore of the lake has to be shifted 50 kilometres (over 30 miles) to the west. From Tanganyika the expedition went west to the Congo by the usual route through the Manyuema country, which was found to be completely pacified,

the remainder of the journey to the Congo mouth being made by canoe, steamer, and railway. In addition to the careful surveys, the results of the expedition are of much value as regards meteorology, zoology, and botany.

AMERICA.

Currents in the Gulf of St. Lawrence.—The *régime* of the currents in the Gulf of St. Lawrence, as elucidated by surveys carried out during the years 1894 to 1896, is fully dealt with in a pamphlet published this year at Ottawa by order of the Minister of Marine and Fisheries. In the first half a description is given of the surface currents themselves, whether constant currents which run more or less continuously, in accordance with the general circulation of the water in the gulf area, or tidal currents produced or chiefly influenced by the tide. The second part treats of the causes which influence the currents in moving as they are found to do. The most important of the constant currents—one at the mouth of the St. Lawrence along the Gaspé coast, the other round Cape North on the west side of Cabot strait—are due to a general outward drift of the water of lower density, apparently derived from the outflow of the St. Lawrence river, which occupies the south-western half of the gulf. The Gaspé current usually occupies a belt of about 12 miles in width, lying from 2 to 14 miles off shore, in the vicinity of Fame point; but in certain cases it may be displaced or even reversed under the influence of abnormal winds. The Cape Breton current, on the west side of Cabot strait, flows almost constantly outwards to the south-east, while on the eastern side of the strait off Cape Ray there is usually a movement of the water to the north-west or inwards towards the gulf. On the west coast of Newfoundland there is an important current to the north-east, which is especially marked from the Bay of Islands to Rich point. In the strait of Belle Isle the current is essentially tidal in character, and there is no foundation for the belief that a constant current runs inwards towards the Gulf of St. Lawrence. At all three angles of the gulf the coldest water forms a layer between the depths of 30 and 50 fathoms, and this cold layer seems to extend very generally over the gulf area. Both this and the deeper water seem, however, to be quiescent. As regards surface density, the denser water, practically the same as that of the open Atlantic (1·0237 to 1·0242), occupies the north-eastern portion of the gulf, the dividing line running from Anticosti to the middle of Cabot strait. South-west of this line the density falls to 1·0220, and in the Gaspé current to 1·0210. In the deep layers it rises even here to 1·0261, which explains the fact that the colder water at 50 fathoms floats upon these. In tracing the general circulation of the gulf, the principle of the balance of flow must be kept in view. There is no confirmation to be found for the theory that a constant current enters the gulf by Belle Isle strait and leaves by Cabot strait. On the contrary, the total volume of water which leaves the gulf by the latter—vastly greater than the volume of fresh water received from the St. Lawrence, though this may be sufficient to dilute the water to the low observed density—is replaced principally by water which enters from the ocean at the same strait, in continuation of the general westward drift along the south coast of Newfoundland. The whole of such movements probably occur within a depth of 50 or 60 fathoms.

Influence of Wind on the Level of Lake Erie.—A recent number of the U.S. *Monthly Weather Review* (May, 1900) contains an interesting note by Prof. A. J. Henry on the fluctuations of level in Lake Erie brought about by the winds. In connection with the survey of the great lakes carried out by the Engineer Corps of the United States army, a continuous record of such fluctuations through a number of months has been kept, and as an equally full record of wind phenomena,

made at the Weather Bureau Offices at Detroit and Buffalo, is available, it is now possible to study the connection which exists between the two sets of facts. It has been known for some years that winds blowing parallel to the axis of the lake tend to heap up the water at the end towards which they blow, and to depress it at the opposite end, the heaping up of the waters in Buffalo harbour being at times a serious menace to wharf and dock property. The effect of the wind on the lake is well shown by the records kept during a storm moving north-east from the Mississippi valley. At Amherstburg the water first rose, then fell and rose again, while converse oscillations were recorded at Buffalo. The fall at the latter and rise at the former are due to the north-easterly winds in front of the advancing storm, while a second oscillation contrary to the first is caused by the shift of wind to a westerly quarter as the storm centre advances along the lake. The amplitude of the oscillations may reach an extreme value of 6 or 7 feet. In the case of a storm passing due east across the lake, with resulting north-west winds, the oscillation was rather transverse than longitudinal. Prof. Henry thinks we may conclude that the oscillations are stationary rather than progressive, no wave of water being propagated, but the whole lake oscillating about a nodal line, at which the fluctuations are zero.

Mr. A. P. Low's Explorations in Labrador.—In the *Journal* for 1899 (vol. xiii. p. 434), reference was made to Mr. A. P. Low's explorations, down to December, 1898, on the east coast of Hudson bay. During the following spring and summer, Mr. Low and his assistant, Mr. Young, who had wintered at Great Whale river, continued their work, both on the coast and in the northern interior of the Labrador peninsula, considerable additions to our knowledge of both being made. A sketch of the results appears in the summary report of the Canadian Geological Survey for 1899. On February 23, Mr. Low started northward, travelling over very rough ice, and meeting many parties of Eskimo on their way to the Hudson bay post. The northern tree limit on the coast was found to be just north of Richmond gulf. On March 2 the coast was left about 10 miles north of the Nastapoka river, the country rising rapidly to about 700 feet. A number of small lakes are surrounded by bare rocky hills, this barren region extending inland about 30 miles, beyond which the valleys contain some soil, supporting clumps of spruce and larch. After crossing the watershed between Hudson and Ongava bays, Mr. Low descended to Tasiagaluk, or Eskimo Seal lake, said to be over 100 miles long, though nowhere more than 15 miles across. It has several narrow bays, all, like the main body, with an east-and-west trend, and at its eastern end gradually narrows into the Leaf river, which is navigable by native umiaks down to Ungava bay. The surrounding country is comparatively flat, with low ridges of rocky hills. Failing to meet with caribou, Mr. Low was forced to return, and on April 3 started with Mr. Young and three others up Great Whale river. Progress was much hampered owing to the exceptionally mild and rainy weather, but the north branch of the river was surveyed to within a few miles of a large lake, which discharges both by this river and by the Little Whale river. The Abchigamich branch, which was surveyed for 15 miles, comes from the north-east, while the main branch makes a circuit from the south and west, its upper course being only 20 miles from the coast. After again returning to the coast, the explorers made ready their yacht for the summer's use, and in it surveyed the coast from Richmond gulf to Rupert river, near the south end of James bay. Summarizing the geological and other results, Mr. Low says crystalline schists, gneisses, and granite occupy the greater part of the area examined, and that a band of unaltered rocks belonging to the so-called Cambrian of Labrador occupies most of the coast and islands from Portland promontory to Cape Jones. At Nastapoka islands they

contain large beds of iron ore, similar to that of the south of Lake Superior. Observations on the drift and glacial striæ near Moose river tended to show that the source of the diamond-bearing drift of Wisconsin and Michigan may be in the Hudson bay region. The peninsula of Labrador was once completely covered with ice, the centre of dispersion lying first in the southern, afterwards in the northern interior. The land has risen at least 700 feet since glacial times, though no appreciable rise seems going on at present.

Glaciers of British Columbia.—Two papers have recently been published in the 'Proceedings' of the Academy of Natural Sciences of Philadelphia on the subject of glaciers in British Columbia, by Messrs. George and William S. Vaux, junr., with map and illustrations. These papers embody the results of several visits more particularly to the Illecellewaet glacier, which is dealt with at some length. It is pointed out that greater glacier development occurs in the eastern or inner ranges of the Rocky mountains, these being the highest and most rugged; so that cooling takes place more quickly than elsewhere, and the precipitation is very rapid. The Great or Illecellewaet glacier is situated within a short distance of Glacier House, in the heart of the Selkirk range. The immense *névé* which feeds it lies on the top of the range forming the divide, and from it several branches flow down into as many valleys. The Great glacier is notable for its freedom from dirt at its foot, and the remarkable rapidity of the ice-fall. Measurements of the rate of flow were determined at nine points on the glacier during 1899, and show a marked decrease as compared with the observations of the Rev. W. S. Green in 1888. They demonstrate the more rapid motion of the central portion of the glacier, and also that the ice on the convex side of the line of flow moves faster than on the concave side. Measurements made in the autumn of 1899 indicate a recession of but 16 feet for the year, as compared with 56 feet, the average of the past eight years; and an average daily recession of but $2\frac{3}{10}$ inches, as compared with $8\frac{1}{10}$ inches at the same period of the previous year. The Asulkan glacier is situated at the head of the valley of the same name, about 4 miles distant from the Glacier House. Its *névé* is connected with that of the Illecellewaet over the ridge which separates them. The two glaciers are said to have at one time extended till they joined and flowed as a common ice stream. The Asulkan glacier was visited in August, 1899, but no marked changes had taken place in it during the year. The Victoria glacier, at the head of Lake Louise, Alberta, is apparently receding and contracting.

Physical Features of the Klondike Gold Fields.—The summary report of the Geological Survey Department of Canada for 1899 includes two or three separate reports, by observers in the field, which are of considerable geographical interest. That by Mr. R. G. McConnell, describing his examination of the auriferous portion of the Yukon district, which has also been issued as a separate pamphlet, forms the clearest account which has yet been published of the structure and physical features of the Klondike region. The pay-gravels hitherto discovered lie almost exclusively within the area bounded by the Klondike river on the north, the Yukon on the west, and the Indian river on the south. This may be described as a high plateau cut in all directions by deep and wide branching valleys. The outlines are rounded, and the ridges, which radiate outwards from the Dome, the highest eminence in the district (4250 feet), have a fairly uniform elevation of about 1500 feet above the valleys. The latter are wide and flat-bottomed in their lower parts, but narrow towards their heads into steep-sided gulches, which terminate abruptly in cirque-like depressions cut into the sides of the ridges. The valley-flats are marshy and partly wooded, the streams narrow, but rapid in their upper courses. The Klondike itself is a large rapid stream, averaging about 50 yards in

width, and interrupted by frequent bars. The Indian river is much smaller, being very shallow, while the channel is filled for long stretches with large angular boulders. The forest trees consist of the white and black spruces, the aspen and balsam poplars, and a species of birch; the white spruce (which, especially on the Klondike, is of surprising size and quality, considering the latitude, and can be easily floated down to Dawson) being the most important tree for general purposes. The ridges are, except on the higher points, covered with an open forest of small trees. The geology of the district is complicated, but four series of stratified and foliated rocks, mostly palæozoic, can be distinguished, as well as granite and other eruptives of tertiary age. Of the former, the Klondike river series, which occupies a zone from north-west to south-east between the Klondike and Indian rivers, without, however, touching either, is the most important, as it constitutes the country rock along the productive portion of all the richer creeks, and is apparently genetically connected with the occurrence of the gold. The rocks are mainly light-coloured and greenish micaceous schists, greatly crushed and altered, and almost certainly derived originally from eruptives. The gravels are classed by Mr. McConnell under four heads, viz., stream gravels (present), terrace gravels, river gravels, and old valley gravels, the last-named including the remarkable deposit, very uniform from top to bottom, known as the quartz drift. It is formed of a compact mixture of small clear quartz grains, minute scales of sericite, and rounded or wedge-shaped boulders of quartz. Gold in paying quantities occurs in the stream gravels, the terrace gravels, and the quartz drift, and the aggregate length of the paying portion of the creeks, as at present known, is estimated at some 50 miles, while a moderate estimate of the gold included gives a value of about £19,000,000. Other sources will, however, in time be utilized. The report is accompanied by a map on the scale of 2 miles to 1 inch.

POLAR REGIONS.

Work of the Russian and Swedish Parties in Spitsbergen.—Further details are now to hand respecting the scientific work carried out in connection with the degree measurement in Spitsbergen, especially that of the Russian party, which met with a cordial reception from the Academy of Sciences on its return to St. Petersburg on October 21. Some account of the operations during the winter, in which the observers were for nine months isolated from the rest of the world, is given in the *Deutsche Rundschau* (vol. 23, p. 45). Their work included astronomical, pendulum, and hourly meteorological observations, as well as a careful study of the aurora borealis, with photographs of the same and of its spectra, the latter of which had never before been obtained. After November, snow-storms of great violence became frequent and caused much annoyance. In December the temperature was comparatively high—the mean being 23° Fahr., or higher than at St. Petersburg. The coldest day (−25·6 Fahr.) was March 4, while on April 13 the temperature was still −18·4 Fahr. Geodetic operations were commenced on March 31, and were continued with great activity in spite of unfavourable conditions. The work accomplished, which is of much value from a geographical point of view, is summarized in the tenth number of *Petermanns Mitteilungen*. The southern part of Spitsbergen was crossed in a variety of directions, the connection between the two coasts being established by way of Mounts Hedgehog and Keibau, on which the signals necessary for the triangulation were erected. It proved impossible to proceed north up the Stor fjord, but Mount Chydenius and the Svenberg were reached from the west coast, and the necessary signals erected. As has already been announced, the work remained incomplete, owing to the impossibility of effecting a junction with that of the Swedish party. Details of the

work of the latter are not yet to hand, but an interesting discovery was that of a mountain south of Treurenberg bay, which was found to have a height of 5580 feet, or 1180 feet higher than the Hornsundstind, hitherto supposed to be the highest summit in the whole of Spitsbergen. The new peak is said (*Globus*, vol. 78, p. 183) to belong to a range which appears to be connected with Mount Chydenius. Other unexpectedly great heights were found in the vicinity of Wijde bay.

Russian Expedition to Novaya Zemlya.—An expedition to the east coast of Novaya Zemlya has been undertaken by the Russian Lieut. Borissoff, who, after preparing winter quarters, passed through Matushkin strait into the Kara sea on August 13, for the purpose of establishing depôts of provisions for a sledge journey next spring. He hopes to make his way northwards along the coast, and complete the survey of the islands.

The Stein Arctic Expedition.—This expedition, as to the safety of which fears have been expressed in some quarters, has apparently extricated itself without mishap from its somewhat precarious position. The Austrian member of the party, Dr. Leopold Kann, arrived at Dundee on November 7, on board the whaler *Eclipse*, and from statements made by him it appears that the expedition has been fairly successful, having during the past summer made numerous excursions leading to an improved knowledge of Ellesmere Land. Details of Mr. Stein's movements have not transpired, but it appears that he was left by Dr. Kann at Cape York so far back as June 9. Visits seem to have been paid to his winter station, both by Peary and his assistants.

Suggested International Co-operation in Antarctic Research.—M. H. Arctowski repeats in *Ciel et Terre* the arguments which he brought before the British Association meeting at Dover,* as to the importance of wide international co-operation in the study of the atmospheric conditions of the antarctic area during the time when the forthcoming British and German expeditions are in the field. He points out that the laws governing atmospheric and oceanic circulation remain very obscure on account of the want of data from the antarctic area, and he emphasizes the importance of simultaneous and combined effort in obtaining records from a number of points on the margin of the south polar area. In 1902 the two expeditions will be supplemented in their work by the observatories of Melbourne and Cape Town, by the German station on Kerguelen, and by Argentine observers in the South Shetlands and at Staten island. He points out that there is still time to organize further co-operation, and that the need is urgent to investigate fully the meteorology of the stormy region of Cape Horn in particular. He suggests the establishment of a polygon of stations uniting South America and the antarctic lands, the suggested points being Punta Arenas, Staten island, Cape Pillar, one of the Diego Ramirez islands south-west of Cape Horn, the Falkland islands, South Georgia, the South Shetlands, and, finally, one or two stations in the lands discovered by the *Belgica*. He thinks that the Chilean government might be induced to send one or two meteorologists to the lighthouse at Cape Pillar; that France should send observers to Diego Ramirez; and that Russia, where neither men nor means are lacking for such an enterprise, should also co-operate.

MATHEMATICAL AND PHYSICAL GEOGRAPHY.

Currents in Australian Waters and the Southern Ocean.—In the fourth instalment of current-paper statistics, placed before the Royal Society of New South Wales, Mr. H. C. Russell has to record an unusually large list of such papers

* *Geographical Journal*, xiv. (1899), p. 584.

received between September, 1898, and October, 1899. In the absence of north-west winds, which had, during the preceding period, apparently carried the bottles to the south of Australia and New Zealand, current papers had arrived unusually fast on the Australian coasts, two and sometimes even three per day having come in, giving a total during the period in question of 124. As regards the currents in the sea east of Australia, these papers confirm the suggestion previously made by Mr. Russell, that there is first a drift to the east, especially south of Sydney, then northwards until the great current from the east passing south of New Caledonia is reached. This idea is supported also by the drift of the *Perthshire* after she was disabled in the Tasman sea. The steady eastward drift from the vicinity of Cape Horn across the Southern ocean is again exemplified by the track of three papers, which, thrown overboard, one at that cape and two near the Falkland isles, were all picked up either on the west or south coasts of Australia. The current would seem to maintain a very uniform course slightly to the north of east. Bottles thrown overboard in the vicinity of Kerguelen and the Crozets were picked up on the coasts of New Zealand, and though the course followed could not be ascertained, the northward tendency of the current just mentioned would seem to favour the idea that they may have been carried round the great Australian bight before passing through Bass strait or south of Tasmania. The rate of drift seems to have been abnormally high during the period under review, particularly that northwards along the east coast of Australia, which is accounted for by the prevalence of southerly winds during the winter and spring of 1899. The Cape Horn papers, however, show a similar abnormal rate, one showing an average per day of 12·2 miles. The papers were fairly evenly distributed through the year, the relatively small number received during April and September being perhaps accounted for by equinoctial disturbances. The record kept by six ships of the total number of bottles thrown out shows that the proportion of those picked up to the total varies from 1 in 7 to 1 in 48.

Lord Dunraven's 'Navigation.' *—There are already so many excellent works on Navigation, both from a theoretical and practical standpoint, that it may at first appear surprising that Lord Dunraven has thought it advisable to add to the number. Raper, Norie, Inman, and others give a vast amount of information on all matters connected with the subject, together with tables for the necessary computations, whilst Lecky's 'Wrinkles,' and books of a similar character, form most useful supplements to these for the practical man. Still, there is doubtless truth in Lord Dunraven's statement in his preface, that "most writers have treated the subject from the point of view of addressing themselves either to the highly educated or to the totally uneducated," and there is, he thinks, room for a treatise designed to meet the requirements of those who lie between these two extremes. This work does not, therefore, presuppose any great amount of mathematical knowledge on the part of the student, nor is it, on the other hand, written on the assumption that it is sufficient to give a number of rules to be learnt off by heart, without any appeal to the reasoning powers, which has too often been done in the past by writers on this and kindred subjects; but by a series of diagrams, lucid explanations, and clearly expressed investigations of formulæ, Lord Dunraven has succeeded in producing a work that will not only be useful to those who are thinking of going up for the Board of Trade examinations, for whom it should possess a special value, but to all who are interested in practical astronomy and navigation. Unlike Raper,

* 'Self-instruction in the Practice and Theory of Navigation.' By the Earl of Dunraven, Extra Master. In two volumes. London: Macmillan & Co. 1900. *Price* 21*s*.

Norie, and others, Lord Dunraven does not give tables of logarithms, logarithmic sines, tangents, cosines, etc., and his work cannot therefore be considered as superseding the standard works on the subject, but should be looked upon rather as supplementing them. In the examples given, Norie's tables have been generally used, but for those who are accustomed to the tables in Raper or Inman, a comparative statement is given at the commencement of the first volume. In order to prevent the work from being inconveniently large, it is divided into two volumes. The first contains, amongst other matters, chapters on logarithms and their use, the sailings, a day's work, the use of the compass, charts, and the simpler nautical astronomical problems. The second volume treats of the more advanced astronomical problems, magnetism and deviation, great circle sailing, tides, the law of storms, and the investigation of the formulæ employed. It further contains numerous exercises, together with the data from the Nautical Almanac of 1898 necessary to work them. There will doubtless be found those who are not altogether prepared to agree with Lord Dunraven in all the opinions he expresses, and would recommend different methods of working some of the problems; or perhaps some would, in certain examples, prefer to use other tables than those here employed. It is possible, too, that occasionally somewhat better and clearer diagrams might have been chosen to represent the cases under consideration; but, taken as a whole, Lord Dunraven may be congratulated on having produced a very practical and serviceable work. There is a full table of contents, but no index, which is certainly to be regretted.

GENERAL.

Memento of Captain Cook's Death.—As announced by the President at the opening meeting of the session, an interesting photograph of the club by which Captain Cook met his death at the hands of the Hawaiian savages has been presented to the Society by the present owner of the club. It is accompanied by an autograph letter of Sir Joseph Banks, the former owner of the relic, to whom it was given by Admiral John Hunter, and who in turn presented it to Thomas Legh, of Lyme Park, Cheshire. The latter was a traveller of some note in his day, publishing in 1816 a narrative of his journey in Egypt and beyond the cataracts. He was one of the founders of the Raleigh Club, the direct precursor of the Royal Geographical Society, and, on the formation of the latter, was one of its original Fellows. The donor of the photograph and letter is his daughter and only child, Mrs. Ellen J. Lowther, of Shigley Hall, Cheshire.

CORRESPONDENCE.

The Aurora Australis and Borealis.

80, Crescent Road, Toronto, Canada, October 24, 1900.

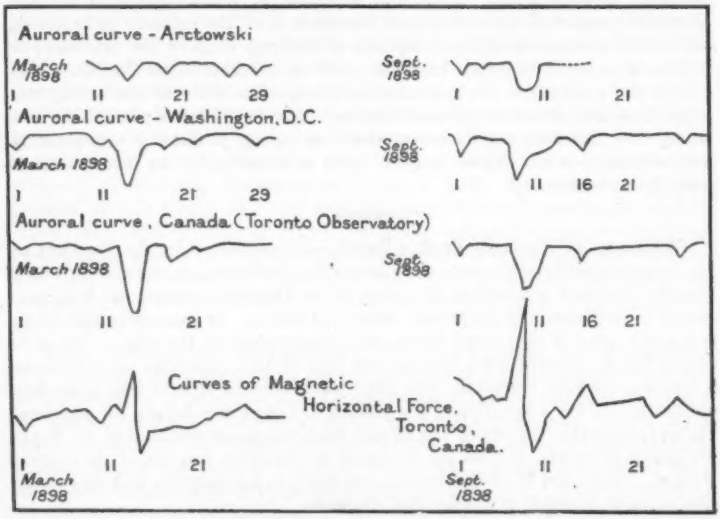
In the July number of the *Geographical Journal* I see recorded in a paper by Mr. Arçtowski the observations on the auroræ australes made by the *Belgica* expedition in the antarctic. They possess special interest to me, for I have for years been wishing for just such observations. I send a paper of mine 'On the Magnetic Influence of the Sun on the Earth and on Comets,' and draw attention to a paragraph on p. 354, which shows the importance to be attached to auroral records in south polar regions.

Mr. Arçtowski says it would be interesting to know if the northern auroræ correspond to the southern in general characteristics and in date, and invites investigations.

As to "characteristics," I may be permitted to say that the features of an auroral display are often so local that a concordance between those in both hemispheres is scarcely to be looked for. We may have a fine auroral arc here, and you may have only fine streamers in your hemisphere, or a rose aurora here with a crown, and you a pale lot of flashing merry-dancers. We may have a great magnetic disturbance, enough to work the telegraphic circuits by, along 10 or 15 degrees of longitude, but the aurora may be visible at one point only on the parallel. Therefore, I do not look for any similarity in the "characteristics" of an auroral display in the antarctic and the arctic regions, as noted in isolated localities.

But as for general excitement, I do expect a concordance, and Mr. Arçtowski's reports enable this to be established for the season of 1898.

We have two sets of observations which we can compare with his. One is to be found in the Weather Reports of the United States Bureau. The number of



AURORAL CURVES IN THE ANTARCTIC AND IN CANADA.

auroræ seen by the correspondents of that Bureau is published every month. The other is in the *Weather Review*, published in Toronto, which gives not only the numbers of auroræ seen by observers, but also the class of aurora, called first, second, third, and fourth.

Now, in examining both of these records, I find, as expected, a remarkable concordance with Mr. Arçtowski's figures. When I say "figures," I mean his observations as expressed in figures so as to make a curve of frequency and intensity.

The antarctic observations show a number of auroræ in March and in September, 1898, with but few in the intervening months. The same thing is noticeable both in the Washington and in the Toronto observations.

The intervening months show similar slight displays at identical times. And as to the two months mentioned, the data are enclosed in the form of curves, and will enable the reader to make the comparison, and establish the identity in times for himself.

I give to Mr. Arçtowski's classes a numerical value for each. It may not be correct, for the relative value of each class may not be accurate, but it cannot be far wrong, and is sufficient for the purpose.

The Washington observations can only be classified in time, *i.e.* by the mere numbers of auroræ seen. The Toronto observations are turned into figures by taking an aurora of the first class as four, one of the second as three, of the third as two, and of the fourth as one.

It may be added that, by the records of the Toronto Magnetic Observatory, the months between March and September, 1898, were very quiet, but on the days of the auroræ in those two months there were severe magnetic storms. It seems certain that if there were a good magnetic observatory in the furthest south accessible, the disturbances would be found to correspond to the day, and possibly to the hour, with those in the northern hemisphere.

ARTHUR HARVEY, F.R.C.S.,
Ex-President of the Canadian Institute and of the Astronomical and Physical Society of Toronto.

Mr. Grogan's Picture of Mount Ruwenzori.

Holland House, New York City, November 11, 1900.

It has been brought to my notice that there is a marked resemblance between the picture of Mount Ruwenzori in my paper (*Geographical Journal*) for August, p. 179, and the photograph in Dr. Stuhlmann's book 'Mit Emin Pasha ins Herz von Africa.' My outline of the mountains was made from the high plateau behind Mboga, when I had a momentary glimpse of the summits through a break in the clouds. On looking through Stuhlmann's book, Mr. McCormick and I noticed that the points of view of Stuhlmann and myself were practically identical, and in the picture Mr. McCormick may have utilized Stuhlmann's photograph for subsidiary detail. This should undoubtedly have been acknowledged, and I trust that Dr. Stuhlmann will attribute the omission to my difficulty in writing and arranging for the publication of the paper and book at a distance from my publisher and artist, due to my having been tied to Gosport by my militia duties. A German critic labours under the delusion that the view of Ruwenzori was taken from the foot-hills of the mass. The view is from the other side of the Semliki valley, where the banana is found to a height of 7000 feet.

EDWARD S. GROGAN.

MEETINGS OF THE ROYAL GEOGRAPHICAL SOCIETY, SESSION 1900-1901.

First Ordinary Meeting, November 12, 1900.—Sir CLEMENTS MARKHAM, K.C.B., President, in the Chair.

ELECTIONS.—*Thomas Inglis Binnie, C.E. Surveyor B.C.A. Protectorate; Lieut. Philip Lansdale, East Lancashire Regiment; Frederick W. Mayers, Imperial Chinese Customs; Montagu Charles Summers.*

The Papers read were:—

"Opening Address." By the President. "An Expedition between Lake Rudolf and the Nile." By Dr. Donaldson Smith.

GEOGRAPHICAL LITERATURE OF THE MONTH.

Additions to the Library.

By HUGH ROBERT MILL, D.Sc., LL.D., *Librarian*, R.G.S.

THE following abbreviations of nouns and the adjectives derived from them are employed to indicate the source of articles from other publications. Geographical names are in each case written in full:—

A. = Academy, Academie, Akademie.
Abh. = Abhandlungen.
Ann. = Annals, Annales, Annalen.
B. = Bulletin, Bollettino, Boletim.
Com. = Commerce.
C. Rd. = Comptes Rendus.
Erdk. = Erdkunde.
G. = Geography, Geographie, Geografia.
Ges. = Gesellschaft.
I. = Institute, Institution.
Iz. = Izvestiya.
J. = Journal.
k. u. k. = kaiserlich und königlich.
M. = Mitteilungen.
Mag. = Magazine.
Mem. = Memoirs, Mémoires.
Met. = Meteorological.
P. = Proceedings.
R. = Royal.
Rev. = Review, Revue.
S. = Society, Société, Selskab.
Sitzb. = Sitzungsbericht.
T. = Transactions.
V. = Verein.
Verh. = Verhandlungen.
W. = Wissenschaft, and compounds.
Z. = Zeitschrift.
Zap. = Zapiski.

On account of the ambiguity of the words *octavo*, *quarto*, etc., the size of books in the list below is denoted by the length and breadth of the cover in inches to the nearest half-inch. The size of the *Journal* is 10 × 6½.

A selection of the works in this list will be noticed elsewhere in the "Journal."

EUROPE.

Alps. **Penck.**

Der Vernagtferner. Von A. Penck. (Separat-Abdruck aus dem Neuen Jahrbuch für Mineralogie, etc. 1898. Bd. ii.) Size 9 × 6, pp. [8]. *Presented by the Author.*

Alps. **Penck.**

Die vierte Eiszeit im Bereiche der Alpen. Vortrag, gehalten den 14 December 1898 von Albrecht Penck. (Vorträge des Vereines zur Verbreitung naturwissenschaftlicher Kenntnisse in Wien. XXXIX. Jahrg. Heft. 3.) Wien, 1899. Size 7½ × 4½, pp. 20. *Presented by the Author.*

Rumania. **Liddell.**

Trade of Roumania for the year 1899. Foreign Office, Annual No. 2486, 1900. Size 9½ × 6½, pp. 30. *Price* 2*d.*

Russia. *B. Comité Géolog. St. Pétersbourg* **18** (1899): 195–233. **Ballore.**

Description sismique de l'Empire Russe. Par F. de Montessus de Ballore. [In Russian, with *Résumé* in French.] *With Map.*

Russia—Lake Ladoga. *C. Rd.* **130** (1900): 1789–1793. **Schokalsky.**

Le lac Ladoga au point de vue thermique. Note de M. Jules de Schokalsky. *With Diagrams.*

See note in *Journal* for October, p. 471.

Scandinavia. **Ahlenius.**

Till kännedomen om Skandinaviens geografi och Kartografi under 1500-talets senare hälft. Af K. Ahlenius. (Mit einem Résumé in deutscher Sprache.) Upsala (C. J. Lundström); Leipzig: Otto Harrassowitz, (1900). Size 9½ × 6, pp. 140. *Presented by the Author.*

This is a study of the knowledge possessed by the geographers of Europe in the latter half of the sixteenth century as derived from maps and books. It is supplementary to the author's earlier work on Olaus Magnus.

Scandinavia—Ice Age. *J. Geology* **8** (1900): 326–332. **Reusch.**

A note on the last stage of the Ice Age in Central Scandinavia. By Hans Reusch. *With Illustrations.*

Spain—Barcelona. **Roberts.**

Trade of Barcelona for the year 1899. Foreign Office, Annual No. 2460, 1900. Size 10 × 6½, pp. 38. *Price* 2½*d.*

Spain—Bilbao. **Larrea.**

Trade of Bilbao and District for the year 1899. Foreign Office, Annual No. 2445, 1900. Size 9½ × 6½, pp. 32. *Price* 2*d.*

Sweden. *B. Geolog. I. University Upsala* **4** (1899): 231–242. **Gavelin.**

On the glacial lakes in the upper part of the Ume river-valley. By Axel Gavelin. *With Map.*

Sweden—Climate. *La G., B.S.G. Paris* (1900): 199–208. **Egnel.**

Le climat de la Suède et les causes des variations de climat, d'après M. Ekholm. Par M. Egnel. *With Maps.*

The maps embrace the whole of Northern Europe. The article is a summary of the memoirs published in *Ymer* during 1899.

Sweden—Gothenburg. **Duff.**

Trade of Gothenburg for the year 1899. Foreign Office, Annual No. 2490, 1900. Size 10 × 6½, pp. 34. *Price* 2½*d.*

Switzerland. *Jahrb. Schweiz. Alpenclub* **35** (1899–1900): 187–202. **Correvon.**

La Vallée de Tourtemagne, en Valais. Par H. Correvon. *With Illustrations.*

Switzerland. *Le Globe B.S.G. Genève* **39** (1900): 109–112. **Rosier.**

Le milieu géographique Suisse considéré comme facteur du développement historique. (*Résumé.*) Par M. W. Rosier.

Turkey—Salonica. **Shipley.**

Trade of Salonica and District for the year 1899. Foreign Office, Annual No. 2468, 1900. Size 10 × 6, pp. 36. *Price* 2½*d.*

United Kingdom—England. **Barnes and Holroyd.**

Mém. S. Spéléologie No. **23** (1900): pp. 19.

La Blue-John-Mine à Castleton (Angleterre). Par MM. Barnes et Holroyd. *With Plans.*

United Kingdom—England. **Bosworth.**

Philips' County Readers. Kent, Past and Present. By George F. Bosworth. London: G. Philip & Son, 1901 [1900]. Size 7½ × 5, pp. x. and 268. *Maps and Illustrations. Price* 2*s. Presented by the Publishers.*

An excellent history of Kent adapted for use as a "reader" in the schools of that county. The geographical sections are subordinated to the historical.

United Kingdom—Ireland. *Economic P.R. Dublin S.* **1** (1899): 1–72. **Johnson.**

The Irish Peat Question. By T. Johnson, D.SC. *With Illustrations.*

United Kingdom—Orkneys. *T.R.S. Edinburgh* **39** (1897–98): 383–424. **Flett.**

The Old Red Sandstone of the Orkneys. By John S. Flett, M.B., etc. *With Map.*

United Kingdom—Scotland. *T.R.S. Edinburgh* **39** (1898–99): 779–826. **Buchanan.**

The Meteorology of Ben Nevis in Clear and in Foggy Weather. By J. Y. Buchanan. *With Diagrams.*

United Kingdom—Rainfall. **Wallis.**

British Rainfall, 1899. On the distribution of Rain over the British Isles during the year 1899, as observed at about 3500 Stations in Great Britain and Ireland, with articles upon various branches of Rainfall work. Compiled by H. Sowerby Wallis. London: E. Stanford, 1900. Size 9 × 5½, pp. 56 and 252. *Portrait, Charts, and Diagram. Price* 10*s. Presented by the Compiler.*

This volume is accompanied by a sketch of the career and an admirable portrait of Mr. G. J. Symons, the founder of the British Rainfall Organization. The work is one of national importance, although entirely organized by a private individual and carried out by the co-operation of a staff of volunteer unpaid workers, the magnitude of which is unexampled in modern scientific enterprise.

United Kingdom—Tide Tables. **Harris and Havergal.**

Tide Tables for the British and Irish Ports for the year 1901: also the times and heights of High Water at full and change for the principal places of the Globe. By Captain H. R. Harris and Commander A. Havergal. London: J. D. Potter, [1900]. Size 10 × 6½, pp. xl. and 262. *Price* 2*s. Presented by the Hydrographer, Admiralty.*

ASIA.

Central Asia. **Demidoff.**

After Wild Sheep in the Altai and Mongolia. By E. Demidoff. London: Rowland Ward, Limited, 1900. Size 9½ × 6½, pp. xii. and 324. *Map and Illustrations. Price* 21*s. net. Presented by the Publishers.*

Prince Demidoff and his wife, together with Mr. and Mrs. Littledale, made the journey which he describes in this volume during 1897. From Barnaul on the Ob the route led south-eastward to the sources of the Chuya river, and thence into Mongolia, up the Kobdo river almost to its source, and then along the northern slope of the Altai mountains. The book is excellently illustrated, and has a clear map.

Central Asia. **Hedin.**

Die geographisch-wissenschaftlichen Ergebnisse meiner Reisen in Zentralasien, 1894–1897. Von Dr. Sven Hedin (Dr. A. Petermanns Mitteilungen. Ergänzungsheft Nr. 131). Gotha: Justus Perthes, 1900. Size 11 × 7½, pp. 400. *Maps. Price* 20 *mark.*

The complete scientific geographical results of Dr. Sven Hedin's three years' work in Central Asia (1894–97).

Ceylon. **Leclercq.**

Un séjour dans l'Ile de Ceylan. Par Jules Leclercq. Paris: Plon-Nourrit et Cie, 1900. Size 7½ × 5, pp. 294. *Map and Illustrations. Price* 4 *fr. Presented by the Author.*

M. Leclercq visited Ceylon after having seen Java, in the hope that he might decide to which island belonged the distinction of being the earthly paradise, but after having tried both he is unable to pronounce for one or the other, so evenly balanced did he find their diverse excellences.

China. **Walton.**

China and the Present Crisis, with Notes on a Visit to Japan and Korea. By Joseph Walton, M.P. London: Low & Co., 1900. Size 8 × 5, pp. xii. and 320. *Map. Price* 6*s. Presented by the Publishers.*

The record of the travels, experiences, and opinions of a Member of Parliament after a tour of eight months' duration in China, and a brief visit to Japan and Korea.

India. **Hunter.**

A History of British India. By Sir William Wilson Hunter, K.C.S.I., etc., volume ii. To the Union of the old and new Companies under the Earl of Godolphin's Award. London: Longmans & Co., 1900. Size 9½ × 6, pp. 420. *Price* 16*s. Presented by Lady Hunter.*

This volume carries on the history of English enterprise in India from 1623 to 1708. The final chapter (1698–1708) had not been written at the time of the author's death, but is supplied following the indications of his notes by P. E. Roberts, who also contributes an introduction to the book.

India. **Sewell.**

A Forgotten Empire (Vijayanagar). A contribution to the History of India. By Robert Sewell. London: Sonnenschein & Co., 1900. Size 10½ × 6½, pp. xxii. and 428. *Maps and Illustrations. Price* 15*s. Presented by the Author.*

The history of the old kingdom which occupied the south of the Indian peninsula, and of the rise and fall of Portuguese power in India. An important part of the work is the translation for the first time of two important Portuguese documents, by Domingo Paes about 1520 and Fernão Nuniz about 1535. There are several maps and numerous photographs of ruins dating from the period of prosperity.

India—Burma. **Sherriff.**

Railway Communication with China. By William Sherriff. The Burmah-China Railway. [Reprinted from the *Manchester Guardian* of March 9, 1900.] Size 8½ × 6½, pp. 4. *Presented by the Author.*

India—Burma.

Tables for the Transliteration of Shan Names into English. Rangoon, 1900. Size 10 × 7, pp. 14. *Presented by the Government of Burma.*

India—Earthquake. *Mem. Geolog. Surv. India* **29** (1899): 380. **Oldham.**

Report on the Great Earthquake of June 12, 1897. By R. D. Oldham. *With Maps and Illustrations.*

This is an exhaustive report on the last great Indian earthquake, which is considered in all its aspects. The main memoir is supplemented by numerous special reports made by members of the Geological Survey deputed to investigate the phenomena in

special districts. The whole is richly illustrated by photographs, diagrams, and seismograph tracings.

India—Irrigation. *J.S. Arts* **48** (1900): 831–837. **Cotton.**

Irrigation in India.

A supplement to an article by General F. C. Cotton in *Blackwood's Magazine* for May, 1900.

India—Kashmir. *Globus* **78** (1900): 222–226. **Francke.**

Eine Besteigung des Karsongpasses (Kaschmir). Von Hermann Francke. *With Illustrations. Also a separate copy, presented by Herr G. Th. Reichelt.*

A summer trip from Leh to the summit of the Kasong pass.

India—North-West Frontier. **Walters.**

The operations of the Malakand Field Force and the Buner Field Force, 1897–98. Compiled in the Intelligence Branch . . . by Captain H. F. Walters. Simla, 1900. Size 13½ × 8½, pp. iv., 90, and 86. *Maps and Plates. Presented by the Intelligence Branch, Simla.*

India—Sikhim Himalayas. **Donaldson.**

Lepcha Land, or Six Weeks in the Sikhim Himalayas. By Florence Donaldson. London: Low & Co., 1900. Size 9 × 6, pp. xii. and 214. *Map and Illustrations. Price* 10*s.* 6*d. net. Presented by the Publishers.*

An excellent account of a six-weeks' journey in one of the least-known parts of the Indian frontier. The photographs are unusually well chosen and illustrative.

Japan—Hakodate. **Chalmers.**

Trade of Hakodate for the year 1899. Foreign Office, Annual No. 2503, 1900. Size 9½ × 6¼, pp. 12. *Price* 1*d.*

Korea. *Rev Française* **25** (1900): 394–398. **Fauvel.**

Corée: Le port de Ma-San-Pho. Par M. A. A. Fauvel. *With Map.*

The position of this port, opened by Korea to foreign trade in 1899, was so little known that it is given erroneously in the supplement to Vivien de St. Martin's Gazetteer.

Malay Archipelago. *Nature* **62** (1900): 327–328. ——

The Cruise and Deep-Sea Exploration of the *Siboga* in the Indian Archipelago. *With Charts.*

Malay Archipelago—Amboina. **Vries.**

Tijds. K. Ned. Aard. Genoots. Amsterdam **17** (1900): 467–502, 593–621.

Reis door eenige eilandengroepen der Residentie Amboina. Door J. H. de Vries.

Malay Archipelago—Borneo. *Oester. Monats. Orient* **26** (1900): 76–79. **Breitenstein.**

Die Handelsverhältnisse auf Borneo und in Niederländisch-Indien. Von Dr. Heinrich Breitenstein.

Malay Archipelago—Borneo. **Keyser.**

Trade of Brunei and Sarawak for the Year 1899. Foreign Office, Annual No. 2491, 1900. Size 9½ × 6¼, pp. 12. *Price* 1*d.*

Malay Archipelago—Borneo and Java. **Breitenstein.**

21 Jahre in Indien. Aus dem Tagebuche eines Militärarztes. Erster Theil: Borneo. Zweiter Theil: Java. Von Dr. H. Breitenstein. Leipzig: Th. Grieben's Verlag (L. Fernau), 1899–1900. Size 9½ × 6, pp. (Theil i.) 264; (Theil ii.) xii. and 408. *Illustrations. Price* 12*s.*

The experiences and observations of an army surgeon who for twenty-one years was in the service of the Netherlands Government in Borneo and Java. The notes on the people and on the conditions as to health are of interest.

Malay Archipelago—Java. **Van der Stok.**

Tijds. K. Ned. Aard. Genoots. Amsterdam **17** (1900): 585–592.

Een nieuwe regenkaart van Java. Door Dr. J. P. Van der Stok. *With Map.*

A new rainfall map of Java on the scale of 1: 1,500,000. The distribution of rainfall is, as a rule, greatest on the watersheds between adjoining river-basins, but there are some curious anomalies, especially in the western half of the island.

Malay Archipelago—Sumatra. **Heldring.**

Tijds. K. Ned. Aard. Genoots. Amsterdam **17** (1900): 622–639.

Poeloe Weh; zijne topographische beschrijving en eenige opmerkingen met betrekking tot de beteekenis van het eiland. Door E. Heldring. *With Map.*

Description of the small island off the northern extremity of Sumatra at the entrance to the Strait of Malacca.

Philippine Islands—Diseases. **Flexner and Barker.**

Johns Hopkins University Circulars **19** (1900): 13–16.

Report of a Special Commission sent to the Philippines by the Johns Hopkins University to investigate the prevalent diseases of the Islands. By Prof. S. Flexner, M.D., and Prof. L. F. Barker, M.D.

Russia—Siberia. *Petermanns M.* **46** (1900): 161–165. **Diener.**

Die geologischen Ergebnisse der Reisen von Baron E. Toll entlang der nordsibirischen Eismeerküste und nach den Neusibirischen Inseln. Von Prof. Dr. C. Diener. *With Map.*

Russian. *La G., B.S.G. Paris* (1900): 81–100. **Saint-Yves.**

Notes sur la distribution des plantes en Sibérie et dans l'Asie centrale. Par M. G. Saint-Yves. *With Illustrations.*

The author, in discussing the vegetation of Northern and Central Asia, points out the close relation of the botanical and physical conditions of the continent, and the influence which the vegetation exercises on the mode of life of the people.

Siam—Malay States. *Scottish G. Mag.* **16** (1900): 505–523. **Annandale.**

The Siamese Malay States. By Nelson Annandale. *With Illustrations.*

Mr. Annandale was junior zoologist on Mr. W. W. Skeat's expedition to the Malay peninsula, and he gives here a narrative of the expedition and a sketch of his impressions of Siam and the Siamese.

Turkey—Baghdad. **Melvill.**

Trade of Baghdad for the year 1899. Foreign Office, Annual No. 2459, 1900. Size 10 × 6, pp. 8. *Price* ½*d.*

Turkey—Erzeroum. **Lamb.**

Trade of Erzeroum for the year 1899. Foreign Office, Annual No. 2477, 1900. Size 10 × 6, pp. 10. *Price* 1*d.*

Turkey—Palestine. **Wilson.**

Palestine Exploration Fund, Quarterly Statement (1900): 365–369.

The Dead Sea. By Major-General Sir Charles Wilson, K.C.B.

Sir Charles Wilson is not inclined to agree with Mr. Gray Hill's suggestion (see *Journal* for November, p. 555) that the bed of the Dead sea is being raised by volcanic agency. He shows that all the variations of level may be explained by the fluctuation of the rainfall.

Turkey—Palestine. **Boddy.**

Days in Galilee and Scenes in Judæa, together with some account of a solitary cycling journey in Southern Palestine. By the Rev. Alexander A. Boddy. London: Gay & Bird, 1900. Size 9 × 6, pp. xxii. and 354. *Illustrations. Price* 7*s.* 6*d. Presented by the Author.*

The author, in apologizing for the predominance of the human element in parts of his narrative, remarks that he "finds it very difficult to keep the natural man in his place for long, even when in the Holy Land." Despite the somewhat deprecatory preface, this volume in no way falls short of the others from Mr. Boddy's pen.

Turkey—Smyrna. **Cumberbatch.**

Trade of Smyrna and District for the years 1897–99. Foreign Office, Annual No. 2462, 1900. Size 10 × 6½, pp. 58. *Plan. Price* 6*d.*

Western Asia—Ararat. *Jahrb. Schweiz. Alpenclub* **35** (1899–1900): 157–183. **Oswald.**

Eine Besteigung des Ararat. Von Dr. Ad. Oswald. *With Illustrations.*

The ascent of Ararat here described was made in October, 1897.

Western and Central Asia. *J. Bombay Br. R. Asiatic S.* **20** (1899): 156–190. **Modi.**

The Cities of Irân as described in the old Palahavi treatise of Shatrôiha-i-Irân. By Jivanji Jamshedji Modi.

AFRICA.

Abyssinia. **Wellby.**

King Menelek's Dominions and the Country between Lake Gallop (Rudolf) and the Nile Valley. By the late Captain M. S. Wellby. (From the *Geographical Journal* for September, 1900.) Size 10 × 6½, pp. 16. *Map.*

Africa—Travel. **Grogan.**

Through Africa from the Cape to Cairo. By Ewart S. Grogan. (From the *Geographical Journal* for August, 1900.) Size 10 × 6½, pp. 22. *Map and Illustrations.*

Africa—Travel. **Grogan and Sharp.**

From the Cape to Cairo, the First Traverse of Africa from South to North. By Ewart S. Grogan and Arthur H. Sharp. London: Hurst & Blackett, 1900. Size 10 × 7½, pp. xvi. and 378. *Portrait, Maps, and Illustrations. Price* 21*s. net. Presented by the Publishers.*

A handsome volume, illustrated by drawings largely from the authors' photographs, and descriptive of the adventurous journey the geographical facts of which have been laid before the Society by Mr. Grogan, and published in the *Journal* for August, *ante*, p. 164.

Algeria. **Wilkin.**

Among the Berbers of Algeria. By Anthony Wilkin. London: T. Fisher Unwin, 1900. Size 9 × 6, pp. xiv. and 264. *Sketch-map and Illustrations. Price* 16*s. Presented by the Publisher.*

Records of an interesting journey, including visits to some of the mountainous and desert parts of Algeria not often visited by British travellers. The photographs are numerous, the subjects well chosen, they are admirably printed, and a fair proportion are good. The spelling of the place-names is French, with, however, a substitution of *w* for the consonantal *ou*, so that some of them will be difficult to trace on either French or English maps.

British East Africa—Zanzibar. **Cornish.**

Trade of Zanzibar for the year 1899. Foreign Office, Annual No. 2520, 1900. Size 9½ × 6½, pp. 14. *Price* 1*d.*

Comoro Group. **Vienne.**

Notice sur Mayotte et les Comores. Par Emile Vienne. (Exposition Universelle, 1900.) Size 9½ × 6½, pp. 200. *Illustrations. Presented by M. Charles Roux.*

So little has been written about the rarely visited islands of Mayotte and Comoro that this volume is relatively of greater importance than most of the other Exhibition memoirs of the French colonies.

Congo State. *Globus* **78** (1900): 93–96. ——

Die Entwickelung von Léopoldville am Stanley Pool. *With Illustration.*

A picture of the harbour at Leopoldville is given in this description of the growth of the great centre of river-trade on the Congo system.

Dahomey. **Fonssagrives.**

Notice sur le Dahomey, publiée à l'occasion de l'Exposition Universelle. . . . Par M. Jean Fonssagrives. [1900.] Size 9½ × 6½, pp. 408. *Map and Illustrations. Presented by M. Charles Roux.*

Egypt. **Kemeid.**

Cairo and Egypt and Life in the Land of the Pharaohs, being a Pictorial and Descriptive Guide to Cairo and the Nile. By Hallil J. Kemeid. Fourth Yearly Edition (Revised). London: Simpkin, Marshall, & Co., 1900. Size 7½ × 5, pp. 196. *Illustrations. Price* 1*s. Presented by the Publishers.*

Egypt—Port Said and Suez. **Cameron.**

Trade of Port Said and Suez for the year 1899. Foreign Office, Annual No. 2509, 1900. Size 10 × 6½, pp. 12. *Price* 1*d.*

Portuguese West Africa. **Sanders.**

Determination of the latitude of Ambriz and of San Salvador (Portuguese West-Africa). By C. Sanders. (K. Akad. van Wetenschappen te Amsterdam.) Reprinted from Proceedings of the Meeting of Saturday, January 27, 1900 (February 21, 1900). Size 10½ × 7½, pp. 10. *Presented by the Author.*

The author, as the mean of numerous observations, has fixed the latitude of the harbour light at Port Ambriz as 7° 49′ 48″ S., instead of 7° 52′ 9″ as given in the Admiralty chart; and for San Salvador do Congo he found 6° 15′ 16″, instead of the previously accepted value, 6° 20′ 10″.

Portuguese West Africa—Angola. **Hauser.**

Questions Dipl. et Colon. **10** (1900): 449–462.

Études sur les colonies portugaises. II. Angola. Par le Professeur Henri Hauser. *With Map.*

Réunion. **Garsault.**

Exposition Universelle de 1900. Colonies Françaises. Notice sur la Réunion rédigée sous la direction de M. A.-G. Garsault. Paris: J. André, 1900. Size 9½ × 6, pp. 308. *Map and Illustrations. Presented by M. Charles Roux.*

Rhodesia.

The British South Africa Company. Information as to Mining in Rhodesia, supplied to the British South Africa Company. 1900. Size 10½ × 8½, pp. 412. *Maps. Presented by the British South Africa Company.*

Reports of the work done by the numerous minor companies engaged in developing the resources of Rhodesia. The output of gold for the first six months of 1900 averaged over 5500 ozs. per month.

Sahara. *Rev. Française* **25** (1900): 415–420. **Vasco.**

Sahara: Le mission Foureau-Lamy. Par M. G. Vasco.

See also an account of this journey with illustrations in *A travers le Monde, Tour du Monde* 6 (1900), pp. 293–294.

Somaliland. **Swayne.**

Seventeen Trips through Somaliland and a Visit to Abyssinia. A Record of Exploration and Big Game Shooting, with descriptive notes on the Fauna of the Country. By Major H. G. C. Swayne. Second Edition. London: Rowland Ward, Limited, 1900. Size 8 × 5, pp. xxii. and 386. *Maps and Illustrations. Price 7s. 6d. net. Presented by the Publisher.*

A new edition of a well-known work of permanent interest.

Somaliland. *J. Manchester G.S.* **16** (1900): 1–30. **Kœttlitz.**

A Journey through Somaliland and Southern Abyssinia to the Shangalla or Berta Country and the Blue Nile, and through the Sudan to Egypt. By Dr. Reginald Kœttlitz. *With Illustrations.*

South Africa. **Colquhoun.**

The Renascence of South Africa. By Archibald R. Colquhoun. London: Hurst & Blackett, 1900. Size 8 × 5½, pp. viii. and 300. *Map. Price 6s. Presented by the Publishers.*

Six chapters deal with "The Land," "The People," "History," "The New Lands of Promise and Disappointment" (under which heading the author considers Mashonaland, Matabililand, British Central and East Africa), "The Economic Future," and "The Settlement." The author explains his object as being "to gather together and present in the simplest form the salient facts in the story of South Africa, and the principal features in the problem of settlement with which, as a nation, we are face to face."

South Africa—Boers. **Leclercq.**

Les Boers et leur état social. Par M. Jules Leclercq. (From 'La Reform Sociale, Bulletin de la Société d'Économie Sociale et des Unions de la Paix Sociale,' No. 931ter Janvier 1900, pp. 70–82.) Paris, 1900. Size 10 × 6½. *Presented by the Author.*

Transvaal and Swazieland. *P.R. Dublin S.* **9** (1899): 12–21. **Lyburn.**

Mining and Minerals in the Transvaal and Swazieland. By E. St. John Lyburn. *With Plate.*

Tripoli—Bengazi. **Alvarez.**

Trade of Bengazi for the year 1899. Foreign Office, Annual No. 2456, 1900. Size 10 × 6, pp. 16. *Price 1d.*

Tunis. *Deutsche Rundschau G.* **22** (1900): 409–413, 486–491. **Levy.**

Die Grundlagen des französischen Protectorates in Tunesien. (Verwaltung, Justiz, Oeffentlicher Unterricht, Heerwesen.) Von Victor Levy. *With Illustrations.*

Tunis—Bizerta. *Rev. Maritime* **144** (1900): 473–508; **145** (1900): 50–79. **Castaing.**

Bizerte: Les souvenirs du passé. Par R. Castaing. *With Maps.*

This treatise traces the history of Bizerta from the Palæolithic period through the historic ages down to the present time.

West Africa. *Questions Dipl. et Colon.* **10** (1900): 412–423. **Hostains and d'Ollone.**

La Mission Hostains-d'Ollone. *With Map.*

NORTH AMERICA.

Alaska.

Eighth Annual Report of the Introduction of Domestic Reindeer into Alaska.—Annual Reports of the Department of the Interior, 1898. Report of the Commissioner of Education. Vol. ii. pp. 1773–1796. Washington, 1899.

Alaska. **Brady.**

Report of the Governor of Alaska.—Annual Reports of the Department of the Interior, 1898. Miscellaneous Reports. Pp. 181–227. *Plan.* Washington, 1898.

A frank statement of the condition of administration and economic development in Alaska.

Mexico and Guatemala. **Seler.**

Auf alten Wegen in Mexiko und Guatemala. Reiseerinnerungen und Eindrücke aus den Jahren 1895–1897. Von Cæcilie Seler. Berlin: Dietrich Reimer (Ernst Vohsen), 1900. Size 10 × 7, pp. xxiv. and 364. *Map and Illustrations. Price* 20 *mark. Presented by the Publisher.*

The record of a journey, "not to find novelties but to seek antiquities," in Central Mexico and Western Guatemala. The book is very richly illustrated, a number of hieroglyphic figures are even reproduced in colour in the text. There is a large-scale map of the route and many sketch-maps of particular localities.

St. Pierre and Miquelon. **Caperon.**

Les Colonies Françaises. Saint-Pierre et Miquelon. Par M. Maurice Caperon. Paris, 1900. Size 9 × 6, pp. 32. *Map and Illustrations. Presented by M. Charles Roux.*

United States. *G.Z.* 6 (1900): 417–434. **Deckert.**

Die Nordamerikanische Union als Weltmacht. (Ein Vortrag.) Von Dr. Emil Deckert.

On the United States as an expanding power.

United States. **Gardini.**

In der Sternenbanner-Republik. Reiseerinnerungen von Dr. Carlo Gardini. Nach der zweiten Auflage des italienischen Originals von M. Rumbauer. Oldenburg and Leipzig: A. Schwartz, [1900]. Size 8½ × 5½, pp. xvi. and 406. *Map and Illustrations. Presented by the Publisher.*

The translation of this excellent Italian work into German is justified, says the translator, because no books on travel in the United States have appeared in Germany for a long time. The book is in the form of a narrative of an extensive tour, with occasional appropriate digressions on the institutions and peculiarities of the country.

United States—Indians. **Grinnell.**

The North American Indians of To-day. By George Bird Grinnell, PH.D. London: C. Arthur Pearson, 1900. Size 12½ × 9, pp. 186. *Illustrations. Price* 21*s. net. Presented by the Publisher.*

On the present number and condition of the Red Indians in the United States. The book is illustrated by fifty-five splendid portraits of Indian chiefs, belonging to twenty-six tribes, in native dress.

CENTRAL AND SOUTH AMERICA.

Andes. **Burckhardt.**

Anales del Museo de la Plata. Seccion Geológica y Mineralógica. II.—Profils géologiques transversaux de la Cordillere Argentino-Chilienne, stratigraphie et tectonique. Par le Dr. Carl Burckhardt. Première Partie du Rapport définitif sur une Expédition géologique effectuée par Dr. Leo Wehrli et Dr. Carl Burckhardt. La Plata, 1900. Size 15 × 11, pp. viii. and 136. *Plates. Presented by the Museo de La Plata.*

This important work gives, in French, the full report of the researches carried on in 1897 by Drs. Burckhardt and Wehrli in the Argentino-Chilian Andes. It is richly provided with maps, sections, diagrams, and photographs.

Argentine-Chilian Boundary.

Argentine-Chilian Boundary. Report presented to the Tribunal appointed by Her Britannic Majesty's Government "To consider and report upon the Differences which have arisen with regard to the Frontier between the Argentine and Chilian

Republics," to justify the Argentine Claims for the Boundary in the Summit of the Cordillera de los Andes, according to the Treaties of 1881 and 1893. [4 vols.] London: Printed for the Government of the Argentine Republic by W. Clowes & Sons, Limited, 1900. Size 13½ × 10½, pp. xviii. and 1182. *Maps and Illustrations. Presented by the Argentine Government.*

These massive volumes contain a complete statement of the evidence for the Argentine case as to the boundary with Chile in Patagonia, including a collection of remarkably fine photographs and numerous maps.

Argentine Republic. ——

Annuaire Statistique de la Ville de Buénos-Ayres. IX^me^ Année, 1899. Buénos-Ayres, 1900. Size 10½ × 7½, pp. xxxii. and 330. *Plan.*

Argentine Republic. *B.I.G. Argentino* **20** (1899): 483–496. **Chanourdie.**

Las Inundaciones en el Rio Negro. Medios de remediarlas. Por Enrique Chanourdie. *With Illustrations.*

Argentine Republic. *B.I.G. Argentino* **20** (1899): 475–482. **Cibils.**

Ferrocarriles proyectados en el Neuquen. Por F. R. Cibils. *With Map.*

Argentine Republic. *B.I.G. Argentino* **20** (1899): 317–341. **Vallejo.**

Departamento Chamical (Prov. de la Rioja). Por G. Vallejo.

Barbados. **Williams.**

Barbados. Report for 1899. Colonial Reports, Annual No. 294, 1900. Size 10 × 6, pp. 34. *Price* 2½*d.*

British Guiana. **King.**

British Guiana. Reports for 1897–98 and 1898–99. Colonial Reports, Annual No. 290, 1900. Size 10 × 6, pp. 56. *Price* 3*d.*

Chile. **Darapsky.**

Das Departement Taltal (Chile). Seine Bodenbildung und Schätze. Von L. Darapsky. Text and Maps. Berlin: Dietrich Reimer (Ernst Vohsen), 1900. Size 10½ × 7, pp. x. and 230. *Illustrations. Price* 30 *m. Presented by the Publisher.*

A full and careful account, with numerous detailed maps and illustrations, of the nitrate-yielding province of Taltal, in the north of Chile.

Porto Rico. **Churchward.**

Trade of Porto Rico for the year 1899. Foreign Office, Annual No. 2465, 1900. Size 10 × 6½, pp. 24. *Price* 1½*d.*

Tobago ——

Imperial Department of Agriculture for the West Indies. Hints and Suggestions on Planting in Tobago. Issued by the Commissioner of Agriculture, 1900. (Pamphlet Series, No. 2.) Size 7 × 5, pp. 20. *Presented by the Commissioner, Imperial Department of Agriculture for the West Indies.*

Trinidad. **Eversley.**

The Trinidad Reviewer for the year 1900. Compiled by T. Fitz-Evan Eversley. London: The Robinson Printing Co. Size 9 × 6, pp. 568. *Map, Plans, and Illustrations. Price* 3*s. Presented by the Publishers.*

This gives an account of the history of Trinidad, with full details of the present condition of the colony, brief biographies of the colonial officials, a directory of the island, and masses of other information, all practical and well arranged.

Venezuela—Caracas. **Andral.**

Trade of Caracas and District for the year 1899. Foreign Office, Annual No. 2466, 1900. Size 9½ × 6½, pp. 24. *Price* 1½*d.*

West Indies. **Millspaugh.**

Plantæ Utowanæ. Plants collected in Bermuda, Porto Rico, St. Thomas, Culebras, Santo Domingo, Jamaica, Cuba, the Caymans, Cozumel, Yucatan, and the Alacran Shoals. Dec. 1898 to Mar. 1899. The Antillean Cruise of the yacht *Utowana*. Mr. Allison V. Armour, Owner and Master. By C. F. Millspaugh, M.D. Part i.—Catalogue of the Species. (Field Columbian Museum. Publication 43, Botanical Series, vol. ii. No. 1.) Chicago, 1900. Size 10 × 6½, pp. 110. *Map.*

Botanical collections made on a yachting trip through the West Indies.

AUSTRALASIA AND PACIFIC ISLANDS.

British New Guinea. **Winter.**

British New Guinea. Report for 1898-99. Colonial Reports, Annual No. 292, 1900. Size 10 × 6, pp. 56. *Price* 3*d.*

Cook Islands. **Gudgeon.**

Cook Islands. Report for 1899. Colonial Reports, Miscellaneous, No. 13, 1900. Size 10 × 6½, pp. 16. *Price* 1*d.*

French Pacific Islands. **Lemasson.**

Notice sur les Etablissements Français de l'Océanie. (Exposition Universelle de 1900.) Size 9½ × 6½, pp. 128. *Map and Illustrations. Presented by M. Charles Roux.*

This report passes in review all the Polynesian islands now under the French flag and gives statistics regarding them.

Melanesia. *Globus* **78** (1900): 69–78. **Luschan.**

R. Parkinsons Beobachtungen auf Bóbolo und Hún (Matty und Durour). Von Felix v. Luschan. *With Illustrations.*

These islands lying north of New Guinea in 2° S. and 143° E. are practically unvisited, and the observations of the people and their weapons here given is therefore of special interest.

POLAR REGIONS.

Antarctic—Belgian Expedition. **Cook.**

Through the First Antarctic Night, 1898–1899. A Narrative of the Voyage of the *Belgica* among Newly Discovered Lands and over an Unknown Sea about the South Pole. By Frederick A. Cook, M.D. With an Appendix containing a summary of the Scientific Results. London: W. Heinemann, 1900. Size 9½ × 6½, pp. xxiv. and 478. *Maps and Illustrations. Price* 20*s. net. Presented by the Publisher.*

This is the first account of the voyage of the *Belgica* published in book form. It gives a full description of the dreariness of the long drift in the antarctic pack, and makes clear several defects in the equipment of the expedition, which, however, notwithstanding exceptional drawbacks, did admirable scientific work. Dr. Cook's photographs and coloured illustrations are in every way admirable.

Arctic—Abruzzi Expedition. *National G. Mag.* **11** (1900): 411–413. ———

Nansen's 'Farthest North' Eclipsed. *With Portraits.*

With portraits of the Duke of the Abruzzi and Captain Cagni.

Arctic—Abruzzi Expedition. *B.S.G. Italiana* **1** (1900): 956–961. **Faustini.**

Il ritorno della Spedizione polare di S.A.R. il Duca degli Abruzzi.

MATHEMATICAL GEOGRAPHY.

Astronomy. *Indian Antiquary* **29** (1900): 189–190. **Jacobi.**

How to calculate the lagna. By Prof. Hermann Jacobi.

The term *lagna* means the point of the ecliptic upon the eastern horizon at a given time.

Cartography—Reliefs. *Mém. S.G. Genève* **39** (1900): 1–10. **Claparède.**

Les Reliefs Perron. Par Arthur de Claparède.

On the qualities desirable in relief models with special reference to M. Perron's great relief of Switzerland on the scale of 1 : 100,000.

Cartography—Reliefs. **Perron.**

Les Reliefs en général et du Relief au 1 : 100,000 de la Suisse en particulier. Par C. Perron. Genève: Librairie Stapelmohr, 1900. Size 8 × 5½, pp. 12. *Presented by the Author.*

On the principles of constructing reliefs on a true scale, and a short account of the new relief of Switzerland on the scale of 1 : 100,000. In this the heights are shown without exaggeration, and the whole is modelled to the true curvature of the Earth.

Navigation. **Dunraven.**

Self-Instruction in the Practice and Theory of Navigation. By the Earl of Dunraven. 2 vols. London: Macmillan & Co., 1900. Size 9 × 6, pp. (vol. i.) xxvi. and 354; (vol. ii.) x. and 390. *Diagrams. Price* 21*s. net. Presented by the Author.*

These volumes contain a statement of the methods of practical and theoretical navigation arranged for the use of students for the Board of Trade certificates, and with special reference to the needs of the yachtsman who is desirous of proving himself capable of commanding his own vessel. A special note is given, *ante*, p. 690.

Surveying. **Bertrand.**

Methods of Survey employed by the Chilean Boundary Commissions in the Cordillera of the Andes. By Prof. A. Bertrand. (From the *Geographical Journal* for September, 1900.) Size 10½ × 6½, pp. 16.

PHYSICAL AND BIOLOGICAL GEOGRAPHY.

Coast Forms. *J. Geology* **8** (1900): 481–484. **Branner.**

The Origin of Beach Cusps. By J. C. Branner. *With diagrams. Also a separate copy. Presented by the Author.*

The author comes to the conclusion that beach cusps are produced by the interference of two sets of waves of translation on the beach.

Geomorphology. **Benest.**

Fleuves sous-marins. Épanchements d'eaux douces au-dessous du niveau de la mer. Par Henry Benest. Extrait du *R. Geographical Journal*, du mois d'octobre 1899. (Université Nouvelle, Institut Géographique de Bruxelles. Publication No. 3.) Bruxelles, 1900. Size 10 × 6½, pp. 32. *Charts.*

Geomorphology. **Penck.**

Eduard Brückner, Die feste Erdrinde und ihre Formen. Ein Abriss der allgemeinen Geologie und der Morphologie der Erdoberfläche. Von Albrecht Penck. (Separatabdruck aus der "Zeitschr. f. d. österr. Gymn." 1899.) Heft 3. Size 9 × 6, pp. 6. *Presented by Dr. A. Penck.*

A review of Prof. Brückner's book.

Oceanography—Arctic Ocean. **Andréeff.**

Mém. S. Imp. Russe G. (*G. Gén.*) **34** (1900): 1-136.

Océan Arctique. Matériaux océanographiques rassemblés pendant les années 1889–1893. Par M. N. Andréeff. [In Russian.] *With Map.*

Oceanography—Atlantic. *P.R.S. Edinburgh* **22** (1897–99): 403–429. **Peake.**

On the Survey by the s.s. *Britannia* of the Cable Route between Bermuda, Turk's Islands, and Jamaica. By R. E. Peake. With Descriptions by Sir John Murray, K.C.B., F.R.S., of the Marine Deposits brought Home. *With Map.*

The map shows the marine deposits between the parallels of Bermuda and Barbuda, and is bounded by the meridians of 60° and 85° W.

Oceanography—Mediterranean. *B.S.G. Italiana* **1** (1900): 699–717, 757–776. **Bertacchi.**

L'Italia e il suo Mare. Come e quanto l'Italia possa aver contribuito alla conoscenza Scientifica del Mediterraneo. Memoria del Cosimo Bertacchi.

On the work done by Italians in the study of the Mediterranean sea.

Oceanography—North Sea. *P.R.S. Edinburgh* **22** (1897–99): 478–481. **Buchan.**

Tidal Currents of the North Sea. By Alexander Buchan, LL.D., F.R.S.

Phænology. **Ihne.**

Phänologische Mitteilungen (Jahrgang, 1899). Von E. Ihne. (Sonderabdruck aus dem xxxiii. Bericht der Oberhess. Ges. f. Natur- u. Heilkunde zu Giessen.) Size 9 × 6, pp. 30. *Presented by the Author.*

Instructions for observing the annual recurrence of seasonal changes in plants, with a special notation for recording the phenomena, a summary of recent literature on the subject, and a note on the influence of latitude on the date of the beginning of spring, which states that in Germany the commencement of spring is four days later for each degree of latitude towards the north. See note, *ante*, p. 680.

Phyto-Geography. *La G., B.S.G. Paris* (1900): 35–40. **Masclef.**

La Géographie botanique et son évolution au XIX^e^ siècle. Par M. A. Masclef.

Sand-dunes. **Baschin.**

Die Entstehung der Dünen. Von Otto Baschin. (Centralblatt der Bauverwaltung. XX. Jahrg. Nr. 38, 16 Mai 1900, pp. 231–232.) Size 13½ × 10. *Presented by the Author.*

Seismology. *P.R.S. Edinburgh* **22** (1897–99): 573–585. **Knott.**

The Propagation of Earthquake Vibrations through the Earth. By Prof. C. G. Knott, D.Sc. (Abstract.)

Terrestrial Magnetism. *Ann. Hydrographie* **28** (1900): 363–370, 435–445. ——

Bericht der Deutschen Seewarte über die Ergebnisse der magnetischen Beobachtungen in dem deutschen Küstengebiete und in den deutschen Schutzgebieten während der Jahre 1897, 1898, und 1899.

Tide. *Nautical Mag.* **69** (1900): 466–483. **Moxly.**

The New Theory of Tide. By Rev. J. H. S. Moxly.

Tides. *Nautical Mag.* **69** (1900): 549–553. **Plumstead.**

Moxly's Theory of the Tides. By E. Plumstead.

Volcanic Phenomena. *Rev. Maritime* **146** (1900): 55–69. **Thoulet.**

Les phénomènes volcaniques dans leurs rapports avec l'océanographie. Par J. Thoulet.

Refers to volcanoes in general, and goes on to deal specially with submarine eruptions and the influence of volcanic phenomena on oceanic deposits.

ANTHROPOGEOGRAPHY AND HISTORICAL GEOGRAPHY.

Ancient Empires. **Maspero.**

The Passing of the Empires, 850 B.C. to 330 B.C. By G. Maspero. Edited by A. H. Sayce. Translated by M. L. McClure. London: Society for Promoting Christian Knowledge, 1900. Size 11 × 7½, pp. xii. and 824. *Maps and Illustrations. Price* 25*s.*

This volume concludes Prof. Maspero's great work on the history of the ancient East down to the downfall of Assyria and Egypt.

Historical. **Beazley.**

New Light on some Mediæval Maps. (IV.) By C. Raymond Beazley, M.A. (From the *Geographical Journal* for September, 1900.) Size 10 × 6½, pp. 12. *Facsimile Map.*

Statistics. *J.R. Statistical S.* **63** (1900): 459–479. **Craigie.**

Address to the Economic Science and Statistics Section of the British Association, held at Bradford, 1900. By Major P. G. Craigie, President of the Section.

On the collection of statistics, especially with regard to the census of the United Kingdom and to agricultural statistics in general.

BIOGRAPHY.

Gerlache and Lecointe. *Deutsche Rundschau G.* **22** (1900): 470–471. ——

Capitän Adrien de Gerlache und Lieutenant Georges Lecointe. *With Portraits.*

The commandant and captain of the Belgian Antarctic expedition.

Grabowsky. *Deutsche Rundschau G.* **22** (1900): 516–519. ——

Friedrich J. Grabowsky. *With Portrait.*

Herr Grabowsky made a journey of exploration in Borneo in 1880, and subsequently travelled extensively in the Malay archipelago and New Guinea, making ethnographical collections.

Jagor. *Deutsche Rundschau G.* **22** (1900): 520–521. ——

Dr. Friedrich Jagor. *With Portrait.*

Born in 1817, the son of an hotel-keeper; died in 1900, a distinguished ethnologist and scientific traveller.

Oswell. **Oswell.**

William Cotton Oswell, Hunter and Explorer. The Story of his Life, with certain correspondence and extracts from the private journal of David Livingstone, hitherto unpublished. By his eldest son, W. Edward Oswell. With an Introduction by Francis Galton, D.C.L., etc. 2 vols. London: W. Heinemann, 1900. Size 9 × 6, pp. (vol. i.) xxiv. and 268; (vol. ii.) xii. and 290. *Portraits, Maps, and Illustrations. Price* 25*s. net. Presented by the Publisher.*

This biography gives for the first time full details of the part played by the late Mr. Oswell in promoting and facilitating the early travels of Dr. Livingstone.

Smith. *Scottish G. Mag.* **16** (1900): 597–599. **[Geddes.]**

Robert Smith, B.Sc. By P. G. *With Portrait.*

A sympathetic notice of the life of Robert Smith, who, though only twenty-six years of age at his death, had qualified himself in a remarkable manner for the study

of botanical distribution, and whose botanical surveys of two of the 1-inch map-sheets of Scotland published this year are examples of how such work should be carried out.

GENERAL.

Astral Gravitation. **Jordan.**

Essays in illustration of the action of Astral Gravitation in Natural Phenomena. By William Leighton Jordan. London: Longmans & Co., 1900. Size 9 × 6, pp. xvi. and 192. *Diagrams. Presented by the Author.*

"Astral gravitation is a convenient term, and seems to me the most appropriate possible term, for representing generally the *resisting force* of gravitation opposing all motion. . . . It is the combined action of the gravitation of the universe, *excepting* the force whose action it opposes. . . . Newton excluded this force . . . but, I say, it has effective action in every detail of terrestrial phenomena." Such is the author's definition of the power in Nature whose effects he proceeds to trace.

Bibliography. **Baschin.**

Bibliotheca Geographica, herausgegeben von der Gesellschaft für Erdkunde zu Berlin. Bearbeitet von Otto Baschin. Band vi. Jahrgang 1897. Berlin: W. H. Kühl, 1900. Size 9½ × 6, pp. xvi. and 444. *Price* 8 *mark.*

This exhaustive geographical bibliography contains over 9000 titles of works published in 1897, including for the first time those appearing in Japanese.

Educational. **Pettipice.**

The Intermediate School Geography (Junior Grade). By T. W. Pettipice. Dublin: Blackie & Son [not dated]. Size 6½ × 4½, pp. 144. *Maps and Illustrations. Price* 1*s. Presented by the Publishers.*

Maps and diagrams, accompanied by lists of names of capes, bays, and similar features, with numerous small-type notes.

Educational. **Pettipice.**

The Irish School Geography for Elementary and Intermediate Schools. By T. W. Pettipice. Part iii. Dublin: Blackie & Son [not dated]. Size 6½ × 4½, pp. 96. *Maps and Illustrations. Price* 6*d. Presented by the Publishers.*

Highly compressed information illustrated by good sketch-maps.

Educational—Geography Chairs. **Penck.**

Die Begründung der Lehrkanzel für Geographie und des geographischen Institutes an der Universität Wien. Von Dr. Albrecht Penck. Wien: Ed. Hölzel, 1898. Size 10½ × 7, pp. 14. *Presented by the Author.*

On the foundation of the Chair of Geography in the University of Vienna.

Medical Geography. **Newman.**

Bacteria, especially as they are related to the economy of nature to industrial processes and to the public health. By George Newman, M.D., etc. Second Edition, with additional matter, including New Chapters on Tropical Diseases and the Bacterial Treatment of Sewage. London: John Murray, 1900. Size 8½ × 6, pp. xvi. and 398. *Illustrations. Price* 6*s. Presented by the Publisher.*

The chapter on the Bacteriology of Tropical Diseases deals with the causes and mode of transmission of malaria, plague, leprosy, cholera, and yellow fever.

Parliamentary Reports, etc. ———

Catalogue of Parliamentary Reports, Papers, etc., relating to Miscellaneous Subjects, 1800 to 1879. Part ii. London: P. S. King & Son [1900]. Size 8½ × 5½, pp. 20.

Place-names. *B.S.G. Lyon* **16** (1900): 365–436. **Steyert.**

Étymologies Lyonnaises. Réponse à M. l'Abbé Devaux. Par M. A. Steyert.

On place-names and their transformations in passing from one language to another.

Rumanian Geographical Society. ———

Societatea Geografică Română. Buletin Număr Jubilar pentru împlinirea a 25 anĭ 1875, 15 Junie, 1900. Bucureşti, 1900. Size 9½ × 7, pp. vi. and 126. *Portraits. Presented by the Rumanian Geographical Society.*

The Rumanian Geographical Society, in celebration of its semi-jubilee, has published a special number of its *Bulletin*, giving an account of the work of the Society, a summary of the contents of the *Bulletin* from the beginning, a list of members, and portraits of the King and leading officers of the Society.

Travel. **Baring-Gould.**

With Note-book and Camera. A Winter Journey in Foreign Lands. By Edith M. E. Baring-Gould. With Preface by Sir W. Mackworth Young, K.C.S.I., Lieut.-Governor of the Punjab. London: Church Missionary Society, 1901 [1900]. Size 8½ × 6¼, pp. viii. and 104. *Illustrations.* *Price* 1*s.* 6*d.* *Presented by the Church Missionary Society.*

Snapshots taken on a journey to India and back.

Travel. *B.S.G. Lyon* **16** (1900): 509–540. **Groffier.**

Explorations et travaux géographiques des Missionnaires Catholiques en 1899. Par M. Valérien Groffier.

Travel. **Selous.**

Sport and Travel East and West. By Frederick Courteney Selous. London: Longmans & Co., 1900. Size 9½ × 6¼, pp. x. and 312. *Illustrations.* *Price* 12*s.* 6*d. net.* *Presented by the Publishers.*

In this volume Mr. Selous describes a series of hunting-trips in Asia Minor and North America, with a number of photographs and drawings of game and incidents of travel. The book is divided about equally between Asia Minor, which was visited in 1894–95, and the Rocky mountains, in which two trips were made in 1897 and 1898, and from both parts of the world there are many notes bearing on natural history, and especially on ornithology.

Tropical Agriculture. *Imp. and Asiatic Quarterly Rev.* **10** (1900): 246–251. **Wallace.**

The Garton lectures on Colonial and Indian Agriculture in Edinburgh University. By Robert Wallace.

NEW MAPS.

By E. A. REEVES, *Map Curator*, R.G.S.

EUROPE.

England and Wales. **Ordnance Survey.**

Publications issued since October 8, 1900.

1-inch—General Map:—

ENGLAND AND WALES (revision):—128, hills engraved in black or brown. 1*s.*

6-inch—County Maps:—

ENGLAND AND WALES (revision):—**Berkshire,** 33 S.W., 37 N.E., 42 N.W., S.W. **Bucks,** 9 N.E., 10 N.W., 12 N.W., 13 N.E., 15 S.E. **Cumberland,** 41 N.W., S.W., S.E., 42 S.W., 48 S.W., 49 N.W., S.W., 50 N.W., N.E., 55 N.E., 58 N.W., 61 S.W., S.E., 62 N.E., S.W., S.E., 63 N.W., S.E., 64 complete, 65 N.E., S.W., S.E., and 71 N.E., 66 N.W., 67 S.W., S.E., 68 S.W., S.E., 69 N.E., 70 N.E., 72 complete, 73 S.E., 77 S.E., 78 S.W., S.E., 79 N.W., S.W., S.E., 82 N.W., 83 N.W., 88 N.E., 90 S.W. **Denbighshire,** 6 S.W., 8 S.E., 12 S.W., 17 N.W., 19 N.W., 24 N.W., 25 S.W., 26 N.W., 27 S.E., 34 S.W., 38 S.E. **Derbyshire,** 36 N.W., 40 N.W. **Glamorganshire,** 4 S.W., 8 S.E., 14 N.E., 15 S.W., 17 S.W., 23 S.E., 25 N.W., S.W., 26 S.W., S.E., 31 N.E., 33 N.W. and 33A N.E., 33 S.W., S.E., 34 N.W., S.W., 35 N.E., S.E., 39 N.W., N.E., 40 N.E., S.E., 42 S.W., S.E., 44 N.W., S.W., and S.E., 45 S.W. **Northamptonshire,** 61 N.E., 62 N.E., 63 N.W., S.W. **Nottinghamshire,** 14 S.W., 15 N.E., 16 N.W., S.W., 27 N.E., 28 N.W., 30 N.W., S.W., S.E., 31 N.W. **Oxfordshire,** 3 N.W., 6 S.W., 10 S.E., 11 S.W., 13 N.E., 14 S.W., 58 N.E. **Staffordshire,** 1 S.W., 3 N.W., N.E., S.W., 8 S.W., 9 N.W., S.W., 11 N.W., N.E., S.W., 12 N.W., N.E., S.E., 13 S.W., N.E., 14 N.W., S.W. **Wiltshire,** 30 S.W. 1*s. each.*

25-inch—Parish Maps:—

ENGLAND AND WALES (revision):—**Anglesey,** XI. 2, 16; XVIII. 3; XXII. 1, 8, 10; XXIII. 6. **Carnarvonshire,** VI. 16; IX. 1, 5; XI. 6, 13, 14, 15; XII. 1, 5, 9, 10; XIII. 4; XIV. 6, 9, 11, 15; XV. 11; XVI. 11, 12, 14, 15, 16; XVII. 1, 13; XVIII. 16; XX. 6, 14; XXI. 3, 8, 11, 12, 13; XXII. 14, 15; XXIII. 13, 14, 15, 16; XXIV. 5, 6, 11, 13; XXV. 8, 11; XXVI. 5, 6, 7, 8, 9, 10, 13, 15; XXVII. 1, 3, 4, 9, 10; XXIX. 8; XXX. 1, 7; XXXIII. 1, 2; XXXIV. 2, 6; XXXIX. 4. **Cumberland,** XIV. 12; XXVII. 14; XXVIII. 13, 14, 15, 16; XXIX. 13, 14, 15, 16; XXX. 13, 14, 15, 16; XXXI. 13, 14, 15, 16; XXXII. 14; XXXVI. 2, 3, 4;

XXXVII. 1, 2, 3, 4, 5, 6, 7, 8; XXXVIII. 1, 2, 3, 4, 5, 6, 7, 8, 11; XXXIX. 1, 2, 3, 4, 5, 6, 10, 12; XLI. 6, 10; XLIV. 8; LX. 5. **Derbyshire**, XL. 13; XLI. 1; XLV. 3, 4, 6, 7, 9, 10, 11, 12, 14, 15, 16; XLVII. 3; LVI. 1, 2. **Glamorganshire**, V. 16; VI. 10; XI. 15; XII. 11; XIX. 3, 14; XXVIII. 2, 7, 14; XXXVII. 5, 11, 13, 15; XLIII. 1; XLVII. 7, 9, 10, 11, 14, 15; L. 8; LVII. 3, 5. **Northamptonshire**, XVI. 3, 4, 10, 11, 13, 14; XXII. 3, 4, 6; XXIII. 2, 3, 5, 6, 7, 8, 14; XXIV. 1, 2, 3, 5, 6, 10, 11; XXXI. 4, 6, 9; XXXII. 1, 3, 4, 12; XXXIII. 1, 3, 9, 10, 13, 14, 15, 16; XXXIV. 9, 13; XXXIX. 2, 4, 7, 8, 11, 12, 13, 16; XL. 2, 3, 4, 5, 7, 8, 11, 13, 14, 15; XLI. 1; XLIV. 16; XLV. 4, 8, 15; XLVI. 1; XLVII. 2, 6; LVI. 6. **Nottinghamshire**, XXXII. 1; XXXIV. 3; XXXV. 3, 4; XXXVIII. 1, 3, 4, 6, 7, 8, 10, 11, 12; XXXIX. 5, 13; XLIII. 1, 7, 9, 15; XLV. 2; XLVI. 14, 15; XLVII. 1, 2, 3, 14, 15; XLVIII. 5; L. 1, 2, 3, 4, 7, 8, 10, 11, 12; LI. 2, 3, 5, 6, 9, 10 and 11, 13; LIV. 1. **Wiltshire**, X. 15, 16; XI. 13; XV. 2, 6, 9, 10, 11, 12, 13, 14, 15, 16; XXII. 2, 3, 4; XXV. 10, 11; XXVI. 1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 16; XXVII. 6, 13, 14; XXVIII. 13; XXXV. 1, 14, 15, 16; XLII. 1; XLVIII. 1, 3, 4, 7, 8, 12; XLIX. 1, 5. *3s. each.*
(*E. Stanford, Agent.*)

England and Wales. **Bartholomew.**

Reduced Ordnance Survey of England and Wales. Scale 1 : 126,720 or 2 stat. miles to an inch. Sheet 23, Hereford. J. Bartholomew & Co., Edinburgh, 1900. *Price* 2*s.* *Presented by the Publishers.*

Historical Atlas. **Poole.**

Historical Atlas of Modern Europe from the Decline of the Roman Empire, comprising also maps of parts of Asia and of the New World connected with European History. Edited by Reginald Lane Poole, M.A., PH.D., Lecturer in Diplomatic in the University of Oxford. Part xxvii. Oxford: The Clarendon Press; London, Edinburgh, Glasgow, and New York: Henry Frowde, M.A.; Edinburgh: W. & A. K. Johnston. 1900. *Price* 3*s.* 6*d.* *Presented by the Clarendon Press.*

This part contains the following maps: No. 8, Europe at the accession of the Emperor Charles VI., 1519, by C. Oman, M.A.; No. 24, England and Wales, showing the Parliamentary Representation according to the Reform Act of 1832, by the Editor; No. 65, Italy, circa 1060–1167, by Miss Lina Eckenstein. Each map is accompanied by brief explanatory letterpress.

Spain. **Deposito de la Guerra, Madrid.**

Mapa Militar de la Capitania General del Norte. Scale 1 : 500,000 or 7·8 stat. miles to an inch. Deposito de la Guerra, Madrid, 1900. Part vi. *Price* 1.50 *pts.*

This map forms one of a series of military maps of Spain now in course of publication by the Spanish War Office, and includes the provinces of Santander, Vizcaya, Guipuzcoa, Alava, Navarra, Lugroño, and Burgos. No hill work is shown, but roads are indicated in red, and many place-names are given.

ASIA.

Asia Minor. **Huber.**

Empire Ottoman, Division Administrative. Scale 1 : 1,500,000 or 23·6 stat. miles to an inch. Par R. Huber. Paris: F. Lœffler. 4 sheets.

China. **Richthofen.**

Karte des nordöstlichen China von F. v. Richthofen. Scale 1 : 3,000,000 or 47·3 stat. miles to an inch. Berlin: Dietrich Reimer (Ernst Vohsen), 1900. *Price* 1 *mark.*

This is No. 3 of a series of maps of China now in course of publication in connection with the present military operations, based upon the surveys of Baron F. von Richthofen, with additional information. The present sheet includes Pekin, the Liau-tung and Shantung peninsulas, the entrance to the Yang-tse-kiang, and the region to the west as far as Sechuan and Kansu. It is coloured to show physical features, the lowlands being tinted green and the highlands brown, in addition to the usual hill shading.

AFRICA.

Egypt. **Schweinfurth.**

Aufnahmen in der Östlichen Wüste von Ägypten, von Georg Schweinfurth. 1 Serie (10 Blätter). Blatt IV., Die südliche Galâla. Scale 1 : 200,000 or 3·1 stat. miles to an inch. Blatt V., Die krystallinischen Küstengebirge am Roten Meer

zwischen dem Uadi Qeneh und Gebel Sēt. Scale 1:200,000 or 3·1 stat. miles to an inch. Berlin: D. Reimer (Ernst Vohsen), 1900.

The first portfolio of maps belonging to this series appeared last year, and was noticed in the *Geographical Journal* for June, 1899. This second issue contains only two maps, Nos. IV. and V., which include that portion of the desert between the Nile and the Red Sea situated approximately within the parallels of 27° and 29° 10′ N. lat., and between long. 31° 50′ E. and the coast. They show the results of Dr. Georg Schweinfurth's explorations and surveys undertaken in the years 1876–77–78, 1884–85, and 1887, and furnish a valuable addition to our knowledge of the geography of this region. The maps are printed in four colours—hill work brown, dry beds of streams green, water blue, and outline, routes and lettering black. Numerous notes on the character of the country traversed are added, and on Sheet V. there is a section showing the geological features of the region from Mount Om Mangul to the sea, along the parallel of 27° 15′ N. lat. Information obtained from the explorations of other travellers is fully acknowledged.

South Africa. **Bower.**

Large-scale Map of the Southern Transvaal and Northern Orange River Colony, with inset of Lydenburg District. Scale 1:253,440 or 4 stat. miles to an inch. Compiled from original surveys and official sources by Thomas Bowyer Bower, A.M.I.C.E., M.I.M.M., F.R.G.S. London: George Philip & Son, 1900. 3 sheets and index. *Price* £2 12*s.* 6*d.* *Presented by the Author.*

Up to the present time this is, doubtless, the best map that has been published of the area it represents, and its scale, 4 miles to an inch, is sufficiently large to admit of a considerable amount of detail being shown without overcrowding. It includes the country from Heilbron, in the Orange River Colony, on the south, to Wolvekraal on the Elands river, on the north, and from Klerksdorp, on the west, to the borders of Swaziland on the east. Pretoria and Johannesburg thus appear in about the centre of the map. On the western sheet there is an inset of part of the Lydenburg district on the same scale as the map itself. The map is printed in colours, and, in addition to the general topographical features and information usually contained on such maps, it shows farms with their official numbers, proclaimed goldfields, and gold reefs.

Mr. Bowyer Bower, the compiler of the map, has had exceptional opportunities for obtaining accurate information, and has himself surveyed a considerable extent of this area, besides which he has made good use of the surveys of others; thus his map will be most serviceable at the present time, although before long it is to be hoped that the country will be systematically triangulated and surveyed on a large scale. A useful index to the names of farms which appear on the map is given as a supplement.

AMERICA.

Argentine. **Buenos Aires and Pacific Railway Co., Ltd.**

Argentine Railways, 1900. Issued by the Buenos Aires and Pacific Railway Co., Ltd., London. Scale 1: 2,534,400 or 40 stat. miles to an inch. Inset map of Buenos Aires. Scale 1: 300,000 or 4·7 stat. miles to an inch. *Presented by the Buenos Aires and Pacific Railway Co.*

A roughly produced map, lithographed in colours, but showing very clearly the different railways and railway systems of the Argentine Republic up to date.

GENERAL.

French Colonies. **Pelet.**

Atlas des Colonies Françaises. Dressé par ordre du Ministère des Colonies. Par Paul Pelet. Paris: Armand Colin & Cie. Livraison iii. *Price* 3 *fr.*

The three maps contained in this part of Pelet's atlas of the French colonies are as follows: No. 9, Afrique Occidentale, I. Sénégal, 1: 3,000,000; No. 12, Congo (feuille sud), 1: 300,000; and No. 26, Polynésie: Établissements français de l'Océanie, on various scales. Like those previously published, these maps have been carefully produced, and are printed in colours. Considerable time has, however, been allowed to elapse between the time of their engraving and that of their publication, as the first is dated April, 1899; the second October, 1899; and the third 1898. Statistical and descriptive information accompanies each map.

Map Slides. **Dickinson and Andrews.**

The "Diagram" Series of Geographical Lantern Slides of Maps. By B. B. Dickinson, M.A., and A. W. Andrews, M.A. To be obtained from G. Philip & Son, London. *Prices* 1*s.* 6*d. each* (*coloured*).

Messrs. Dickinson and Andrews deserve the thanks of all geographical lecturers

and teachers for having produced a series of most useful and effectively coloured lantern slides of maps of all parts of the world, which deserve to be more widely known and generally used than they are at present. The following is a list of those recently published, in addition to others which were noticed in the *Geographical Journal* for June, 1899:—

The World.—(1) Orographical; (2) Mean annual rainfall; (3) Rainfall, December, January, February; (4) Rainfall, March, April, May; (5) Rainfall, June, July, August; (6) Rainfall, September, October, November; (7) Wind systems, January; (8) Wind systems, July; (9) Isobars, January; (10) Isobars, July; (11) Cables and telegraph lines; (12) Steamship routes and principal railways; (13) Strategic importance of the Canadian Pacific Railway.

Europe.—(14) British Isles, orographical; (15) England and Wales, orographical; (16) Wales, orographical; (17) Scotland, orographical; (18) Ireland, orographical; (19) France, political, 1789; (20) France, chief wine districts; (21) France, orographical; (22) German Empire, river basins; (23) German empire, orographical; (24) Holland and Belgium, river basins; (25) Holland and Belgium, political; (26) Netherlands, orographical; (27) Iberian peninsula, political; (28) Iberian peninsula, river basins; (29) Italy, river basins; (30) Italy, orographical; (31) Balkan peninsula, political; (32) Balkan peninsula, river basins; (33) Balkan peninsula, orographical; (34) Russia, river basins; (35) Austrian empire, orographical; (36) Austrian empire, river basins; (37) Switzerland, chief passes; (38) Switzerland, political; (39) Switzerland, river basins.

Asia.—(40) Asia, orographical; (41) South-East Asia, means of communication; (42) South-East Asia, commercial; (43) South-East Asia, orographical; (44) Indian empire, orographical; (45) North-West Frontier, political.

Africa.—(46) Means of communication; (47) Orographical; (48) Africa in 1884, before Berlin conference; (49) Africa in 1885, after Berlin conference; (50) Africa at the close of the Brussels conference, 1890; (51) Cape Colony, commercial; (52) Cape Colony, communications; (53) Cape Colony, south-west, orographical; (54) Cape Colony, east, orographical; (55) Cape Colony, west, orographical and political; (56) Cape Colony, west, political; (57) Natal, orographical; (58) British Central Africa, orographical.

America.—(59) North America, orographical; (60) North America, river basins; (61) North America, economic (minerals); (62) Canada, political; (63) Canada, mean temperature, June, July, August; (64) North-West Canada; (65) British North America, orographical; (66) British North America, zones of vegetation; (67) United States, historical, 1782; (68) United States, orographical; (69) United States, river basins; (70) United States, political; (71) Central America, political; (72) South America, orographical.

Australia.—(73) Orographical; (74) New Zealand, mean annual rainfall; (75) New Zealand, means of communication.

World. **Philip.**

Philips' London School Board Atlas. A series of forty coloured plates, containing over ninety maps and plans, printed in colours, and 8 pages of introductory letterpress. Edited by G. Philip, Junr., F.R.G.S. London: George Philip & Son, 1900. *Price* 1*s*. *Presented by the Publishers.*

This is a commendable attempt to produce a school atlas at a low price on the more enlightened and improved system of teaching geography, and certainly it is a great advance on the cheap school atlases published fifteen or twenty years ago. It has been compiled by Mr. George Philip, Junr., according, as it is stated in the introductory remarks, to the recommendations of a special advisory committee of the London School Board. The maps are both physical and political, and in some cases the latter are drawn on the same scale as the former. The relief is shown by hill-shading and tints of colouring, but occasionally the difference between the latter is not sufficient to be clearly distinguished. One commendable feature of the atlas is that the scales on which the maps are drawn all bear a fixed and simply expressed proportion to one another; that of the maps of the British Isles (1 : 5,000,000) has been taken as the unit, and as many maps as possible have been drawn on this scale. Insets of England or the British Isles, on the scale of the general maps, have been given on all the maps dealing with regions lying outside Europe. Care seems to have been taken in the selection of place-names, and in their spelling the system recommended by this Society has been taken as the guide. Preceding the maps are several pages of introductory letterpress, giving information on map-reading, scales of maps, projections, and matters of a kindred character, which in some respects might be improved and corrected. For instance, in reference to Mercator's projection it is stated that on it "the shortest distance between any two places on the Earth's surface can be found by simply connecting them with a straight line," and that "it is this feature

which makes Mercator's projection so useful to sailors." This is evidently a mistake. What is doubtless intended is that the correct bearing between any two places is shown by connecting them by a straight line, which is quite a different thing from the "shortest distance" between them.

Although there is room for improvement, still, bearing in mind the low price of the atlas, it must be considered, on the whole, to be a really creditable production, and furnishes additional evidence of the fact that the efforts of this Society in the direction of geographical education are beginning to bear fruit.

World. **Vivien de Saint Martin and Schrader.**

Atlas Universel de Géographie. Ouvrage commencé par M. Vivien de Saint Martin et continué par Fr. Schrader. Paris: Librairie Hachette et Cie. Sheets: 21, Italie; 40, Russie Orientale et Caucasie. *Price 2 fr. each sheet. Presented by the Publishers.*

CHARTS.

Admiralty Charts. **Hydrographic Department, Admiralty.**

Charts and Plans published by the Hydrographic Department, Admiralty, July and August, 1900. *Presented by the Hydrographic Department, Admiralty.*

No.	Inches.	
2640		The World, showing currents (republication). 2*s.* 6*d.*
883 m =	6·8	Scilly isles:—St. Mary's road and Crow sound. 2*s.* 6*d.*
1839 m =	6·75	Scotland, west coast:—Portree harbour. 1*s.* 6*d.*
2260 m =	1·4	Norway, south coast:—Songvaar fiord to Lillesand, including Christiansand fiord. 2*s.* 6*d.*
1327 m =	1·4	Norway, south-east coast:—Portör to Neolunghavn. 2*s.* 6*d.*
3130 m =	1·4	Norway, west coast:—Utvœr to Atleö, including Bue or Aspö fiord. 2*s.* 6*d.*
1145 m =	1·4	Norway, west coast:—Vaagsö to Skorpen. 2*s.* 6*d.*
1145 m =	1·4	Norway, west coast:—Rövde and adjacent fiords. 2*s.* 6*d.*
1633 m =	0·8	New Brunswick:—Chaleur bay, eastern part. 2*s.* 6*d.*
1673 m =	3·0	Brazil:—Port Angra dos Reis and Jacuacanga bay (reproduction). 1*s.* 6*d.*
1930 m =	0·8	Mexico, west coast:—Magdalena bay. 2*s.* 6*d.*
333 m =	2·4 / 8·0	Vancouver island:—Baynes sound and approaches, Union bay. 2*s.* 6*d.*
3127 m =	12·0	Vancouver island:—Port Augusta (Comox). 2*s.*
3132 m =	1·8	Alaska:—Saginaw and Security bays. 1*s.* 6*d.*
3143 m =	0·35	Plans in Alaska:—St. Michael bay. 1*s.* 6*d.*
3134 m =	0·28	Lake Nyasa (northern portion). 3*s.*
3135 m =	0·28	Lake Nyasa (southern portion). 3*s.*
1401 m =	3·0	Mauritius:—Grand port. 2*s.*
543 m =	2·4	Red sea:—Kamaran passage and southern approach. 2*s.* 6*d.*
3032 m =	0·5	Upper Yang tse Kiang:—Kwei chau fu to Chung King fu. 2*s.* 6*d.*
2823 m =	2·0	China, north coast:—Wei hai wei and approaches. 2*s.*
1798 m =	0·75	China, north-east coast:—Kwang tung peninsula and approaches to Port Arthur. 2*s.* 6*d.*
3112 m =	5·9	Japan:—Misumi ko Fukin. 1*s.* 6*d.*
2680 m =	0·25	Japan:—Approaches to Kobé. 1*s.* 6*d.*
120		River Schelde:—Plan added, Vlissingen or Flushing.
426		Greece, east coast:—Plan added, Port Kumi.
2834		Newfoundland:—Plans added, Green cove, Trout river bay.
922		British Columbia, Burrard inlet:—Plan added, First narrows.
2089		Africa, east coast, Tugela river to Delagoa bay:—Plan added, entrance to Kosi river.
1235		Persian gulf, mouth of the Euphrates, Shatt al Arab and Bahmishir river:—Plan added, Karun river.
2678		Yang tse Kiang:—Plan added, Anchorage off Nanking.

Charts Cancelled.

No.		Cancelled by	No.
2640	The World, showing currents.	New chart. The World, showing currents	2640
2260	Christiansand and Songvaar fiords.	New chart. Songvaar fiords to Lillesand	2260

No.		Cancelled by	No.
1673	Jacuacanga bay.	New plan. Port Angra dos Reis and Jacuacanga bay	1673
1930	Magdalena bay.	New plan. Magdalena bay	1930
585	Plan of Union wharf and anchorage.	New plan. Union bay	333
585	Plan of Port Augusta on this sheet.	New Plan. Port Augusta	3127
1578	Lake Nyasa (southern portion).	New chart. Lake Nyasa (southern portion)	3135
1401	Grand port.	New plan. Grand port	1401
3032	Kwei chau fu to Chung king fu.	New chart. Kwei chau fu to Chung king fu	3032
2823	Wei hai wei harbour.	New plan. Wei hai wei and approaches	2823
1798	Kwang tung peninsula, etc.	New chart. Kwang tung peninsula	1798
2827	Ta lien hwan, Odin cove.		
14	Plan of Kamaran bay on this sheet.	New plan. Kamaran passage	543

Charts that have received Important Corrections.

No. 2973, England, south coast:—Cowes harbour. 2693, England, east coast:—Orwell and Stour rivers. 108, England, east coast:—The Wash, Skegness to Blakeney. 1770, Baltic:—Port of Libau. 199, Adriatic:—Brindisi to Ortona. 1559, Adriatic:—Gulf of Trieste. 1561, Adriatic:—Ports and anchorages in the gulf of Quarnero. 1581, Adriatic:—Approaches to Port Sebenico. 1612, Adriatic:—Ports and anchorages in Dalmatia. 1238, South Shetland and South Orkney islands. 852, United States, east coast:—Sapelo sound to St. Andrew sound. 1289, South America, west coast:—Guaytecas islands to Cape St. Antonio. 579, British Columbia:—Fraser river to north-east point of Texada island. 22, Persian gulf:—Kuweit harbour. 1419, Andaman islands:—Long island to Port Blair. 942B, Eastern Archipelago, eastern portion. 2194, Anchorages in northern part of Celebes. 2759A, Australia, northern portion. 1043, Australia, north coast:—Gulf of Carpentaria. 1044, Australia, north coast:—Gulf of Carpentaria to Cape Ford. 1042, Australia, north coast:—Cape Stewart to Port Essington. 613, Australia, north coast:—Melville island. 475, North-west coast of Australia. 1047, Australia, west coast:—Cape Ford to Buccaneer archipelago. 1055, Australia, west coast:—Bedout island to Cape Cuvier. 917, Harbours and anchorages on west coast of Australia. 413, Australia, south coast:—Cape Mentelle to White point. 2130, Tasmania:—Port Davey. 447, Western approaches to Torres strait. 1970, New Zealand:—Auckland harbour entrances. 981, Caroline islands:—Seniavina islands. (*J. D. Potter, Agent.*)

United States Charts. **U.S. Hydrographic Office.**

Pilot Charts of the North Atlantic Ocean for October, and North Pacific Ocean for November, 1900. U.S. Hydrographic Office, Washington, D.C. *Presented by the U.S. Hydrographic Office.*

PHOTOGRAPHS.

Sierra Leone. **Weller.**

Eight Photographs of Sierra Leone, taken by C. L. Weller, Esq., 1900. *Presented by C. R. Weller, Esq.*

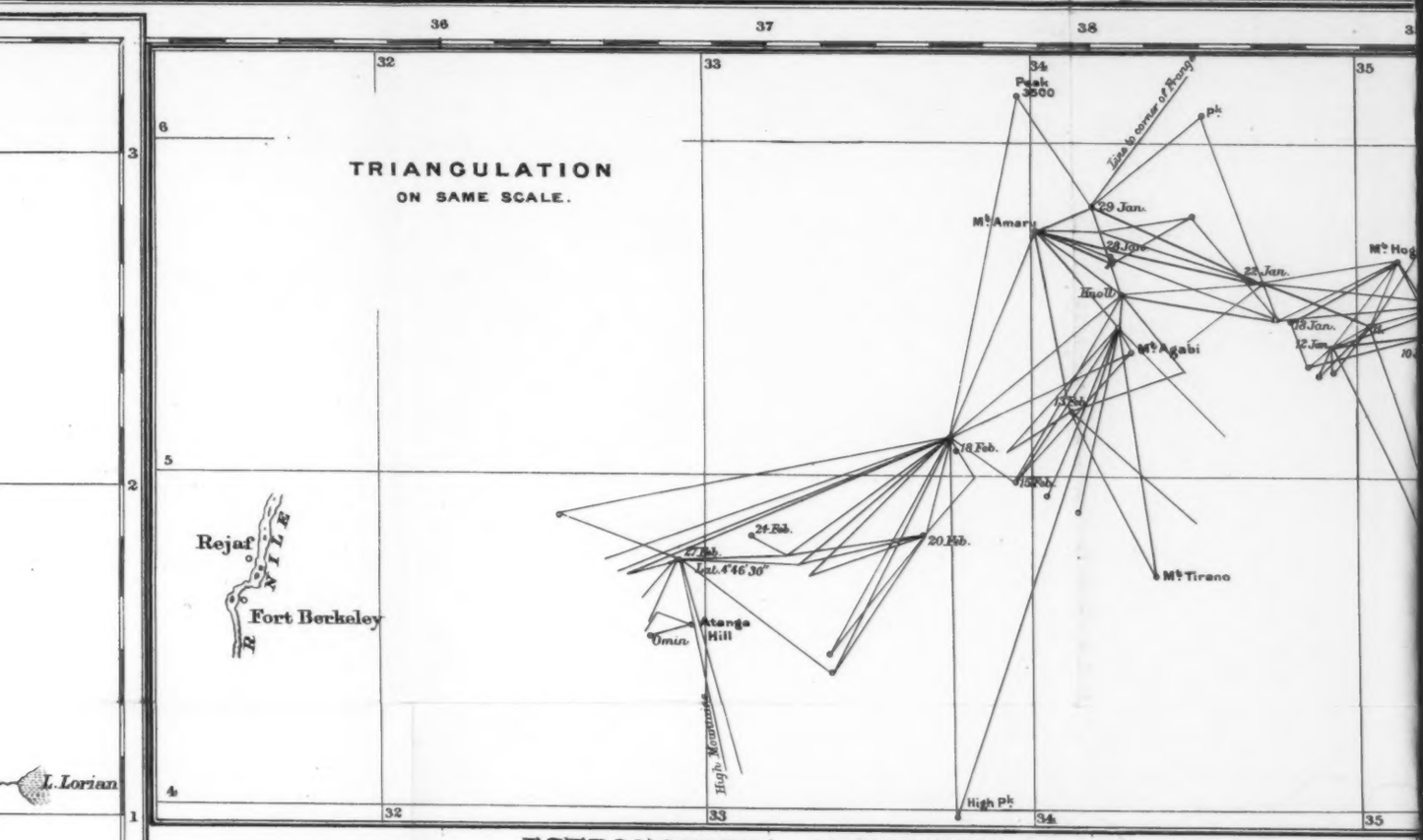
These are whole-plate photographs, and serve to illustrate the character of the scenery and native life of Sierra Leone. The following is a list of their titles:—

(1) Village of Ybeng; (2) Rokelle river; (3, 4) Village of Rokon; (5) River Taia; (6) Natives building houses; (7) Group of natives; (8) Natives burning bush.

N.B.—It would greatly add to the value of the collection of Photographs which has been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.

XUN

37
38
39
Longendoti
4800
Leibera
RENDILE
B O R A N
River flows to Jub
Gurza?
Barkenji Vil.
Aug 21.95
Low Hills
Mt. Koroli
Road to Mt. Oru (Boran)
KOROLI
LAKE
RUDOLF
Elmolo
Kuiol 3650
2350
Extinct Volcano
2480
Elmolo
Telekia camp
Bush & Grass
Rendile Villages
Stony, Flat
Magnetic Ironstone
RENDILE & LAIGOP (Masai)
Camels, Horses, Sheep, Cattle, Goats.
Mt. Marsabit 5220
Forest
3850
Sogorti Crater L. 4720
Red Clay
Roti
Telekia Vol.
Mt. Njaro
Open, undulating
Flat & Open
Bush
Water
1770
Warkas
No Water
2250
Lasami's
ARGEL
Loloki
SOGNA
OR
GUDAS
Dum Palms
2030
Sep 18
WANDOROBO
Dum Palms
Red Sand
Bush
No Water
Red Sand
Bush
Guaso Nyiro
Green bushes
Hills
1500
Sep 23
Thorn bush interspersed with green bushes
Charler Falls
Dum Palms
Tug
1150
Oct 3
Dense Thorn bush
Rough broken country
A few Tugs with Dum Palms
Oct 4
Oct 5
Oct 6 .95
R. Tana
Bolarti
Bor
R. NILE
LADO
Gondokoro
3500
GORMA
2300
5000
no water
Cultivation
Villages
1500
4000
29 Jan.
Mt. Amaru
Jan 28
1750
Waterless
Jan 31
Magoia
villages
1500
KATUA
Cattle
Feb 1
MADUI
Villages
Mt. Gabi
3200
Valley
Swamp in rainy season
Plain (uninhabited) called "Kopowen" by Natua
Flat plain, swampy in rainy season
Uninhabited desert or swamp according to season, called "Okalela plain" by Lukoyo
Plain 1500 ft. appr.
Many villages
Wells
AKARA
Feb 13
Feb 18
Feb 19
AKARA
Longe Nu



ASTRONOMICAL OBSERVATIONS.

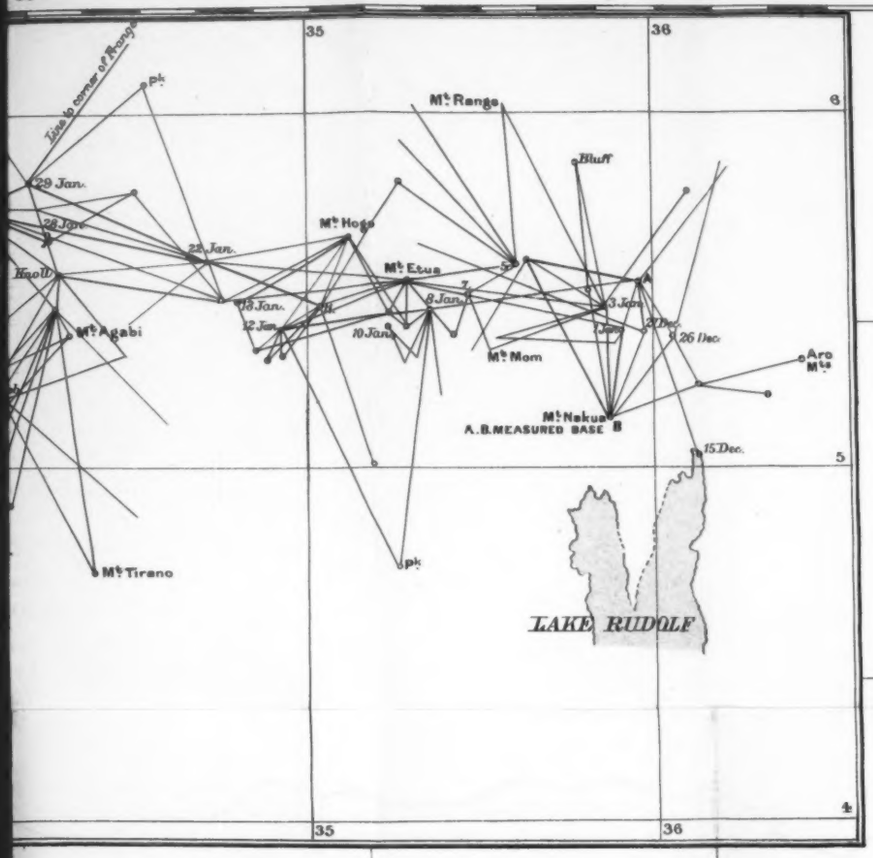
1894-95.

Date.	Place.	Latitude.	Longitude.
1894.			
Aug. 13.	Bodele	7° 41′ 0″ N.	42° 28′ 15″ E.
,, 24.	Crocodile Camp	7 15 38	42 28 15
Sept. 1.	Webi Shebeli ...	7 11 35	42 25 35
,, 5.	Rawa	7 18 37	
,, 9.	Berbade	7 19 14	42 9 15
,, 21.	Sheikh Husein ...	7 43 38	40 44 30
Oct. 30.	Sheikh Mahamed	7 19 0	
Dec. 7.	Finik	7 1 0	
1895.			
Jan. 13.	Gumer	5 33 30	44 17 0
Feb. 2.	Moliko	5 22 12	43 54 30
,, 3.	Tug. Yuali ...	5 19 26	
,, 4.	Berdale	5 18 0	43 35 0
,, 6.	Gohule	5 8 32	43 8 0
,, 11.	Bargheilo... ...	4 41 30	42 35 15
,, 14.	Barmetawen ...	4 36 0	42 28 15
,, 15.	Fidegan	4 28 10	42 9 15
,, 17.	Merlka Garsli ...	4 14 0	
	Buntal Ferry ...	4 8 30	42 10 0
,, 22.	Warwai		42 7 45
,, 24.	Handudu	4 1 30	41 52 42
,, 27.	Mata Safaro ...	3 58 30	41 40 45
Mar. 1.	Yabuch	3 58 0	
,, 3.	El Modo	3 57 55	41 13 30
,, 7.	Dida Guba ...	3 52 30	
,, 9.	Aimola	4 5 30	40 21 15
,, 22.	El Dere	4 4 30	39 57 30
,, 25.	Kurava Wells ...	4 4 30	39 51 0
,, 26.	Garsa	4 5 9	39 40 20
,, 29.	Le	3 50 30	39 25 0
,, 30.	Buki Pond ...	3 55 0	
,, 31.	Gof...	3 55 22	
April 1.	Egder	3 53 57	38 53 45
April 9.	Ile		38° 27′ 45″
,, 15.	Argasa	4 43 0	38 16 0
,, 21.	Elwayi Dist ...	5 7 0	37 55 0
,, 23.	Burga Camp ...	5 29 0	37 56 10
,, 30.	Camp near Galana Amara	5 30 15	37 51 45
May 11.	L. Abaya	6 2 52	37 47 0
,, 18.	Budesa	5 18 0	37 43 15
,, 20.	Near Rua... ...	5 12 0	37 35 15
,, 22.	Lenja	5 1 0	37 31 30
,, 28.	Near El Re ...		37 8 20
,, 29.	L. Stefanie, N.E. end	4 55 55	37 8 15
June 14.	L. Stefanie ...	4 30 50	36 50 15
,, 27.	Camp	5 25 0	
,, 28.	Gura	5 30 22	
,, 30.	Camp	5 18 0	
July 14.	Camp at Kusia, L. Rudolf	4 45 0	36 7 15
	Camp on Nianam Buki Village ...	5 9 43	
	Camp	5 21 33	
,, 29.	Camp S. of Bodu	5 46 47	
Sept. 18.	Camp	5 53 24	
,, 23.	Camp near the Geaso Nyiro ...	1 19 0	
Oct. 3.	Camp	0 59 0	36 43 15
,, 4.	,, ...	0 35 37	39 4 15
,, 5.	,, ...	0 12 22	
,, 6.	Bolarti		39 5 30
			39 11 30

1899-1900.

Date.	Place.	Latitude.	Longitude.
Aug. 24.	Gagap	8 9 40	43 47 30
,, 26.	Sesebani	7 57 30	43 43 30
,, 30.	Sheikh Hosh ...	7 27 30	44 0 24
Aug. 31.	Hado	7° 22′ 23″	43° 46′ 45″
Sept. 3.	Sheneli	6 39 11	43 36 22
,, 8.	Godi	5 52 20	43 16 0
,, 12.	Camp	5 43 6	43 23 36
,, 13.	,, ...	5 36 30	43 15 45
,, 22.	Yaber Khair ...	4 48 0	
,, 23.	Bargheilo... ...	4 41 30	
,, 26.	Fidegan	4 28 10	
Oct. 2.	On Web	4 10 16	42 5 36
,, 5.	Unsi	4 5 0	42 0 4
,, 6.	Handudu	4 1 30	41 52 42
,, 18.	Aimola	4 5 30	40 21 15
Nov. 10.	Camp	4 0 48	
,, 12.	,, ...	4 2 0	
,, 13.	S. Mt. Hobur ...	4 4 0	
,, 14.	Camp	4 6 30	
,, 17.	Camp	4 11 27	
Dec. 10.	L. Rudolf... ...	4 34 9	36 8 40
,, 12.	,, ...	4 31 36	36 8 40
,, 13.	,, ...	4 35 15	
,, 27.	R. Omo	5 22 38	
Jan. 3.	Near R. Omo ...	5 28 46	
,, 7.	E. Mt. Etua ...	5 28 15	35 58 15
,, 8.	S.E. ,, ...	5 28 30	
,, 11.	Camp	5 28 15	
,, 12.	,, ...	5 21 17	
,, 18.	,, ...	5 29 38	
,, 21.	,, ...	5 32 24	
,, 28.	,, ...	5 39 42	
Feb. 15.	,, ...	4 55 30	
,, 17.	,, ...	5 0 39	
,, 20.	Edjo	4 48 59	
,, 25.	Camp	4 49 27	

38 39 40 41



to illustr

NORTH E

Dr A. DO

Route of Exp

" "

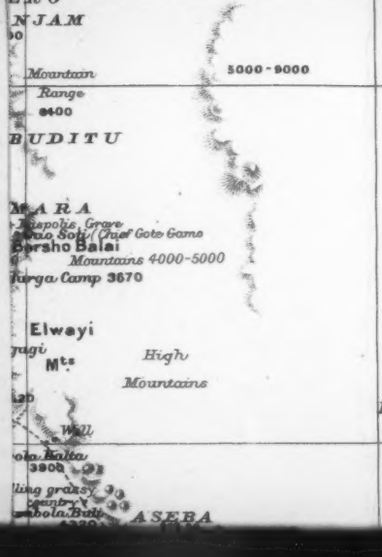
0 10 20

Natural Scale, 1:

Tug (

The Map

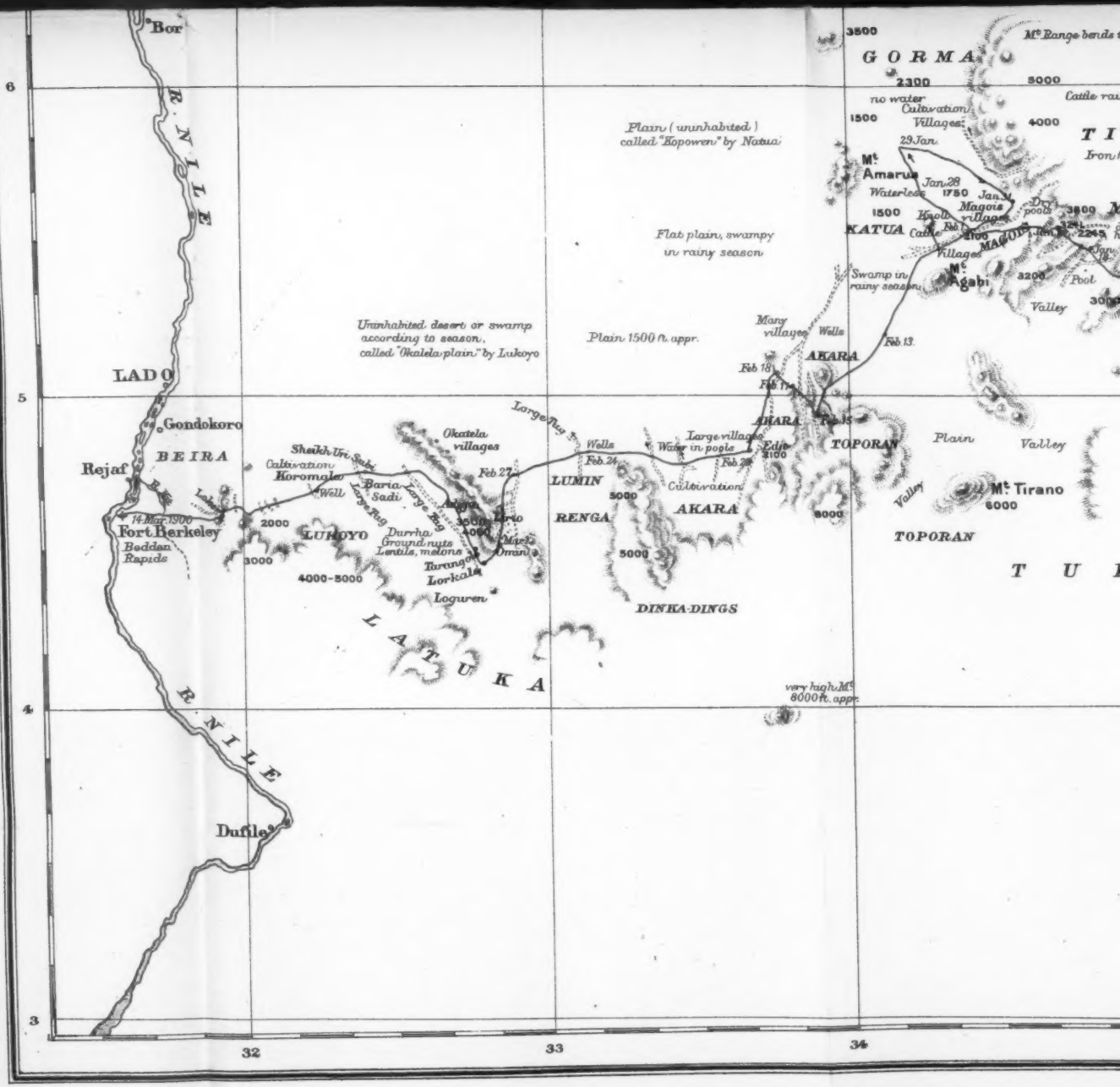
Place.		Latitude.			Longitude.		
Hado		7°	22'	23"	43°	46'	45"
Sheneli		6	39	11	43	36	22
Godi		5	52	20	43	16	0
Camp		5	43	6	43	23	36
"		5	36	30	43	15	45
Yaber Khair ...		4	48	0			
Bargheilo... ...		4	41	30			
Fidegan		4	28	10			
On Web		4	10	16	42	5	36
Unsi		4	5	0	42	0	4
Handudu		4	1	30	41	52	42
Aimola		4	5	30	40	21	15
Camp		4	0	48			
"		4	2	0			
S. Mt. Hobur ...		4	4	0			
Camp		4	6	30			
Camp		4	11	27			
L. Rudolf... ...		4	34	9	36	8	40
"		4	51	36	36	8	40
"		4	55	15			
R. Omo		5	22	32			
Near R. Omo ...		5	28	46			
E. Mt. Etua ...		5	28	15	35	58	15
S.E. " ...		5	28	30			
Camp		5	28	15			
"		5	21	17			
"		5	29	38			
"		5	32	24			
"		5	39	42			
"		4	55	30			
"		5	0	39			
Rdjo		4	48	59			
Camp		4	49	27			

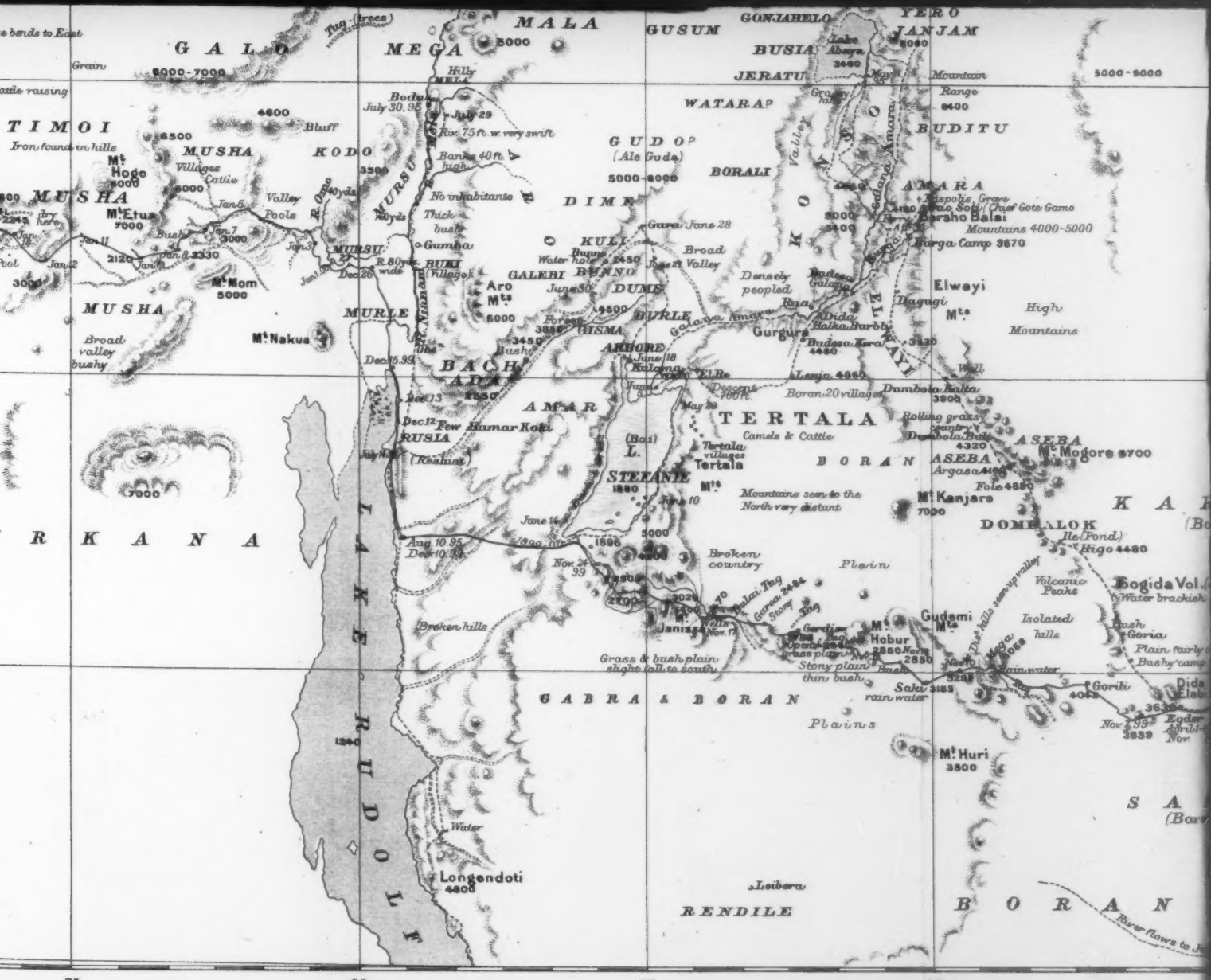


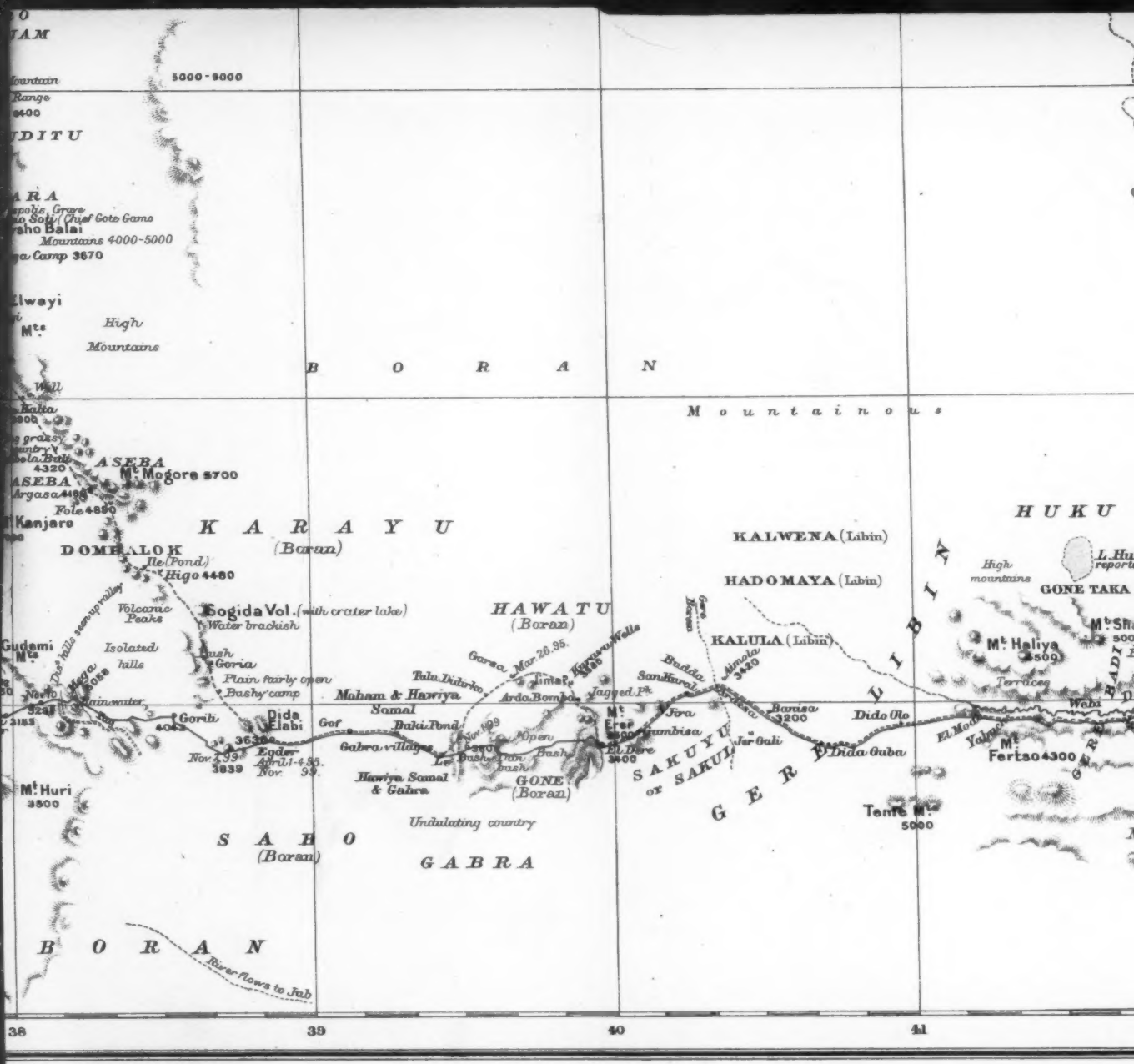
B O R A N

Mountainous

MAP
strate Explorations in
EAST AFRICA.
by
DONALDSON SMITH
Expedition in 1894–5
„ „ 1899-1900
Scale of Miles.
40 60 80 100
, 1:2000,000 or 31·56 miles = 1 inch.
Tug (Torrent bed) „ Spring, Well.
Heights in feet.
e Map has been constructed from the Author's survey only.
42
43
44
45
GULF OF ADEN
BERBERA
July 10 1884
April 1 1899
Bulhar
Waseyo
Daragalli
Lifarole
Sik
Hargessa
Daboin
Dabokadeh
Adan Zeala
Adan Goriado
10
9
8
7
6
5
GUBAN
HAUD
OGADEN
ALA
ANIA
RAIA WACHALI
AULIHAN
ADEN RAYA
BAI RER ALI
GALJAL
JUTJIL
MAHLIN WAINI
Jerer Valley
Gelaksar
Plateau or Level of Hamla
Hil mil
Gagap
Lafkei 3700 (Water)
Habr ad Erdsor
Sibi Desert
Bushy Hills
Morala
El Kar
El Yonga
Aug 1.94
Aug 2.99
Sescbani 3240
Grass
Hadad
Tug Foten
Tug Jerod
Flat topped hills
Sheikh Hosh
Hado
Low Hills
Tug
Wells
Low hills
Thick bush
Bush Sept.
Well dry
Flat Bush
Shenekl
Large Wells
Oldcamp Jan 4 95
Boda Denan
Villages
Turr
Ture (deserted)
Tore Wells
2000 to 2500 ft
(approximately)
Gebas
Many small hills
Ardegob
Duda Harik
Water unpool 4 Wells
Wabi Shebeli
Godi
Mountainous
Met Prince Boris Tago
Dec 21 94
Kaldash
Bushy Plain, valleys with trees
Mountains
Gandabella
Land of death
Grass Plateau
Bodle
Pools
Tug Lomo
(Good Well all Year)
Steep passes
2850
3350
2850 Aug 18
Canon 8 ft wide
Tug Lomo
Tug Dakhas
Tug Siud
Roko
3670
Kololo 3780
Balakure
Bagara
Berbadle (Galla)
Waldam (Galla)
Rasa
2300
Rasa Allah
Fgi
Crocodile Camp 1700
River 300 ft wide
Salphur Spr.
Ferik 1880
5000
2540
2300
Dec 1. 2790
Hilly
Water
El Wak
Muri
Bushy
Dabagop
Tug Sheikh
Tug Washago
Mobiko
Berdale
Girili Hill
Mulata
Well
Galedi
Jan 31 95
Hallowin Hill
Bari
Gamer
Mabrouken
Sept 13
Pools
Well
Dore
Mamango
Atarot
Gohule 2020
Botele
Hadel
Hada Garsi 1280
ADEN KHAIR
Jilieh
Sept 23
Faber Khar
Tug Weadel


Bor
R. NILE
LADO
Gondokoro
BEIRA
Rejaf
Fort Berkeley
14 Mar 1900
Bedden Rapids
Duffile
Sheikh Uri Sabi
Cultivation
Koromala
Well
Baria Sadi
Large Rug
LUKOYO
2000
3000
4000-5000
Durra
Ground nuts
Lentils, melons
Okatela villages
Feb 27
Lolo
3500
4000
Mixed
Omani
Turanga
Lorkala
Loguren
LATUKA
Uninhabited desert or swamp according to season, called "Okalela plain" by Lukoyo
Plain (uninhabited) called "Kopowen" by Natua
Flat plain, swampy in rainy season
Plain 1500 ft. appr.
Large Rug
Wells
Feb 24
LUMIN
RENGA
5000
Large villages
Water in pools
Feb 28
Cultivation
AKARA
6000
DINKA-DINGS
very high Mts 8000 ft. appr.
Many villages
Wells
Feb 13
AKARA
Feb 18
Feb 19
AKARA
Feb 15
TOPORAN
3100
Plain
Valley
Mt Tirano
6000
TOPORAN
T U
GORMA
3500
Mts Range bends
2300
5000
no water
Cultivation
Villages
1500
4000
29 Jan
Mt Amarua
Waterless
Jan 28
1750
Jan
Magora villages
Dry pools
3800
1500
Knolls
Feb
Cattle
1100
KATUA
MADI
Villages
Mt Agabi
3200
Pool
Swamp in rainy season
Valley
3000
Cattle ran
Iron
T I
6
5
4
3
32
33
34


GALLO
MALA
MEGA
GUSUM
GONJABELO
YERO JANJAM
BUSIA
JERATU
WATARAP
GUDOP (Ale Guda)
BORALI
DIMEA
KULI
BUNNO DUMS
BURLE
HISMA
ARBORE
BACHADA
AMAR
TERTALA
BORAN
ASEBA
DOMBALOK
STEFANIE
RUSIA
LAKE RUDOLF
GABRA & BORAN
Plains
RENDILE
TIMOI
MUSHA
KODO
MURLE
BUKI
GALERI
BUDITU
AMARA
ELWAYI
Elwayi
Mt Nakua
Mt Mom
Mt Etua
Mt Hogo
Mt Kanjere
Mt Mogore
Mt Huri
Gudomi
Hobur
Janisse
Longendoti
Leibera
Tertala
Gara Jane 28
Gamba
Aro
Few Hamar Kolk
Broken hills
Grass & bush plain
Stony plain than bush
Broken country
Plain
Volcanic Peaks
Isolated hills
Bogida Vol.
Water brackish
Goria
Plain fairly
Bushy camp
Rain water
Saka
Gorib
Dida
Egder
Mountains seen to the North very distant
Mountains 4000-5000
Burga Camp 3670
Camels & Cattle
Boran 20 villages
Rolling grass country
Argasa
Fole
Higo
Ile (Pond)
Lanja
Dambola Kalta
Dambola Bali
Gurgura
Badesa Kera
Badesa Galgalo
Densely peopled
Broad valley
Broad Valley
Iron found in hills
Villages
Cattle
Valley
Pools
Bluff
Thick bush
Banks 40 ft. high
No inhabitants
Water hole
Bush
Grass
Rocks
Hilly
Grain
Tug (trees)
Mountain Range
Lake Abaya
Chief Gote Gamo
Bepoke Grass
Bepoke Soft
Bepoke Sandy
Bepoke Stony



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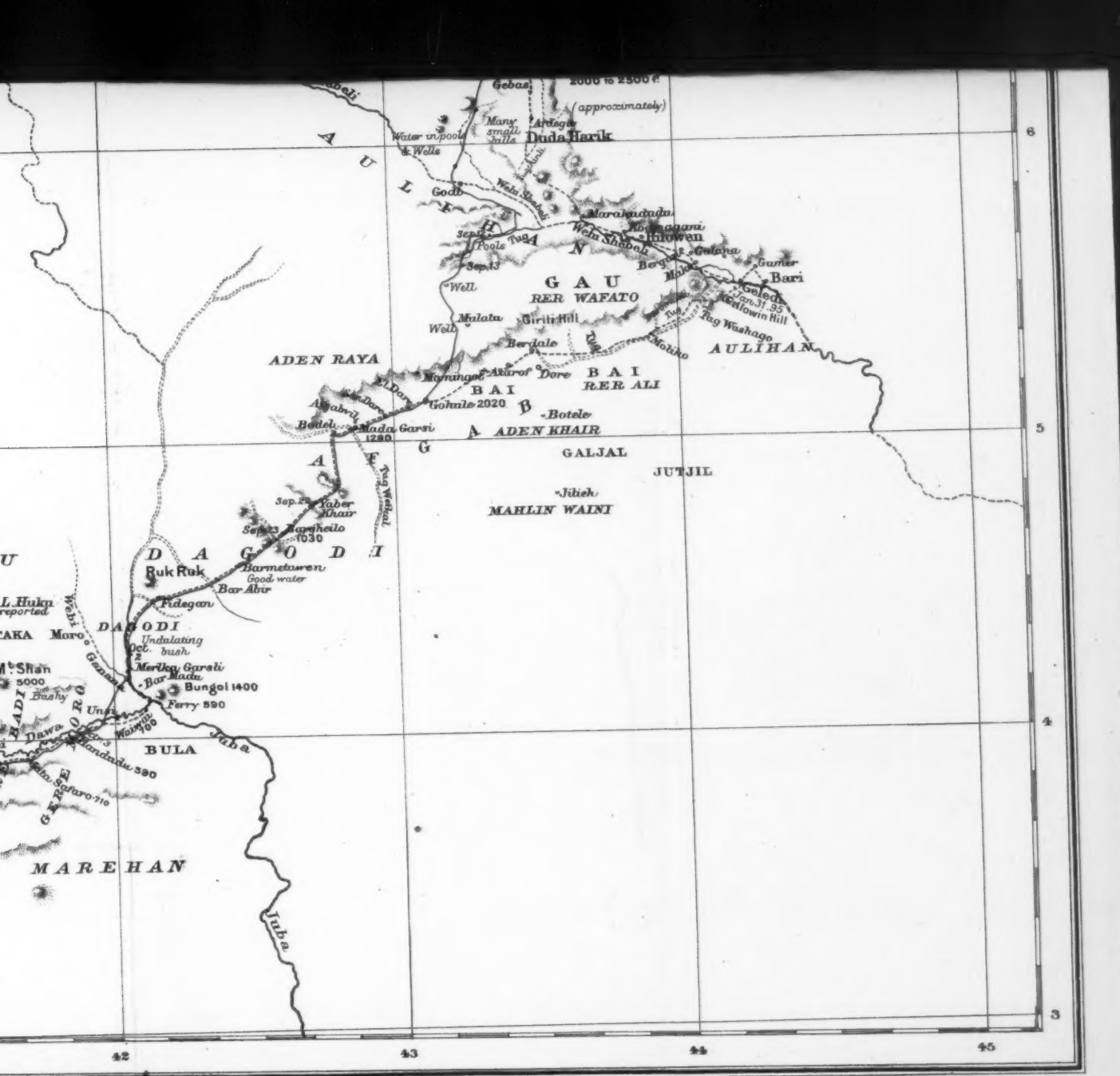

F.S. Weller, F.R.G.S., lith.

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E.G.R.

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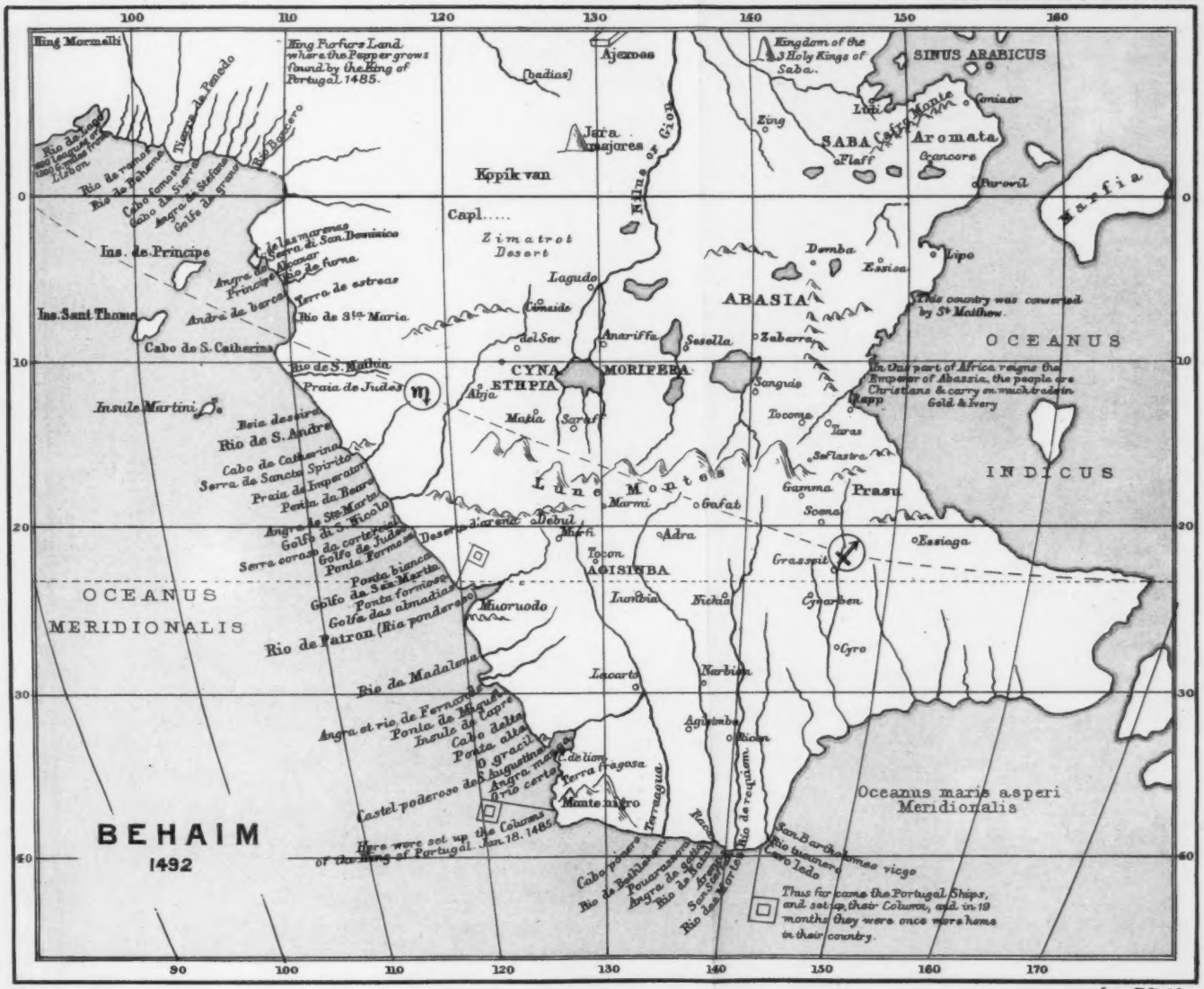

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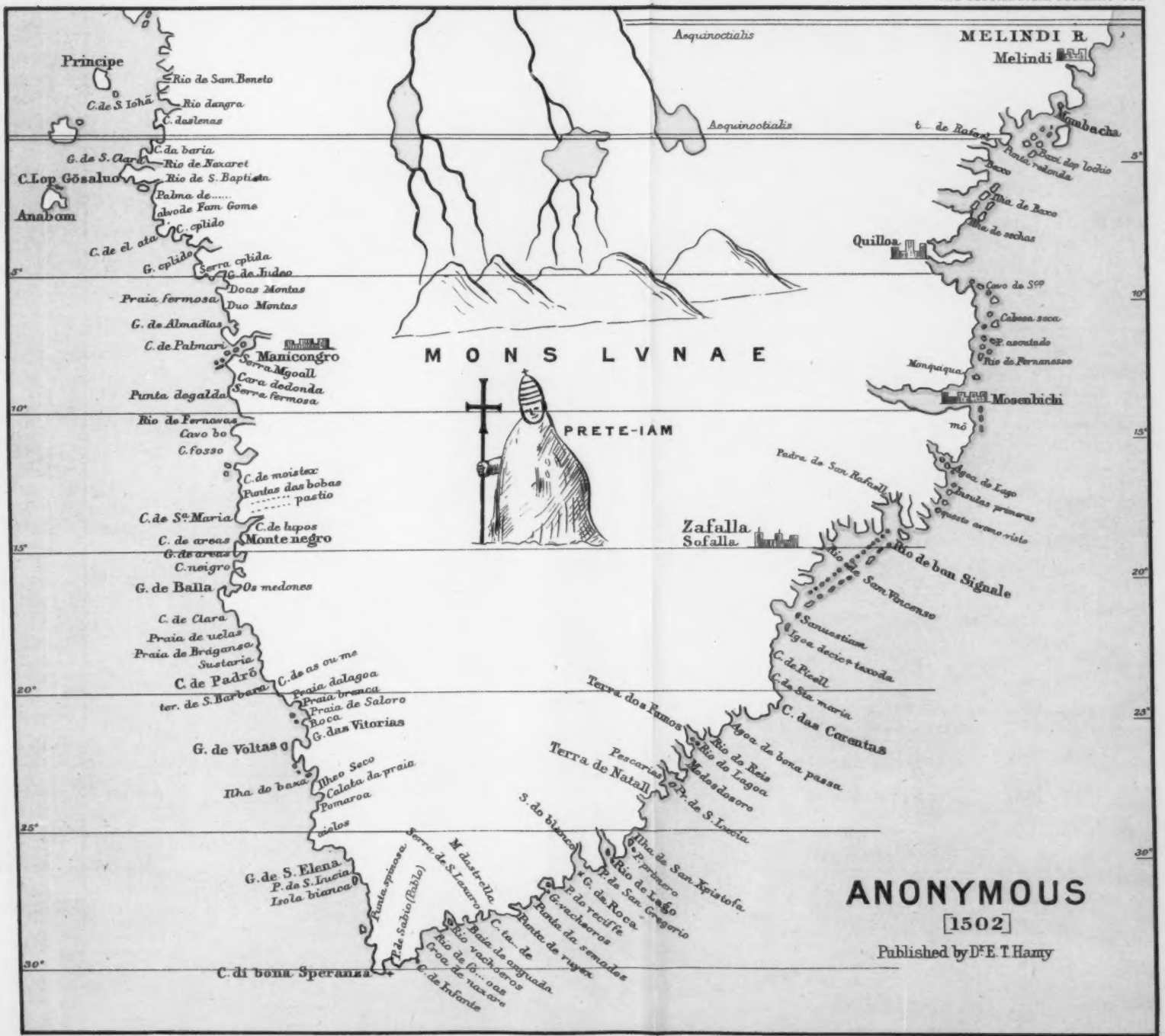

ANONYMOUS

[1502]

Published by Dr E. T. Hamy

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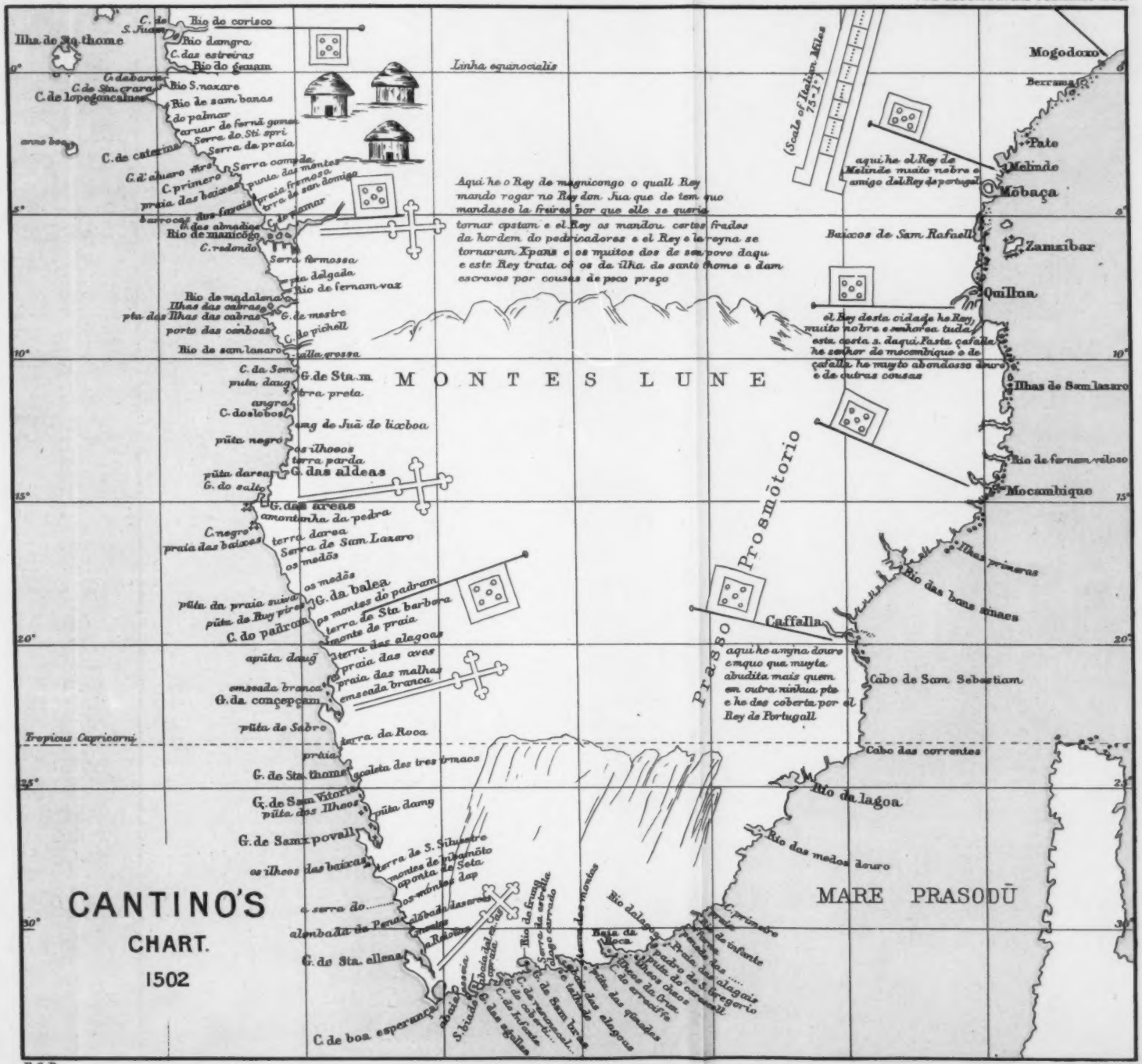
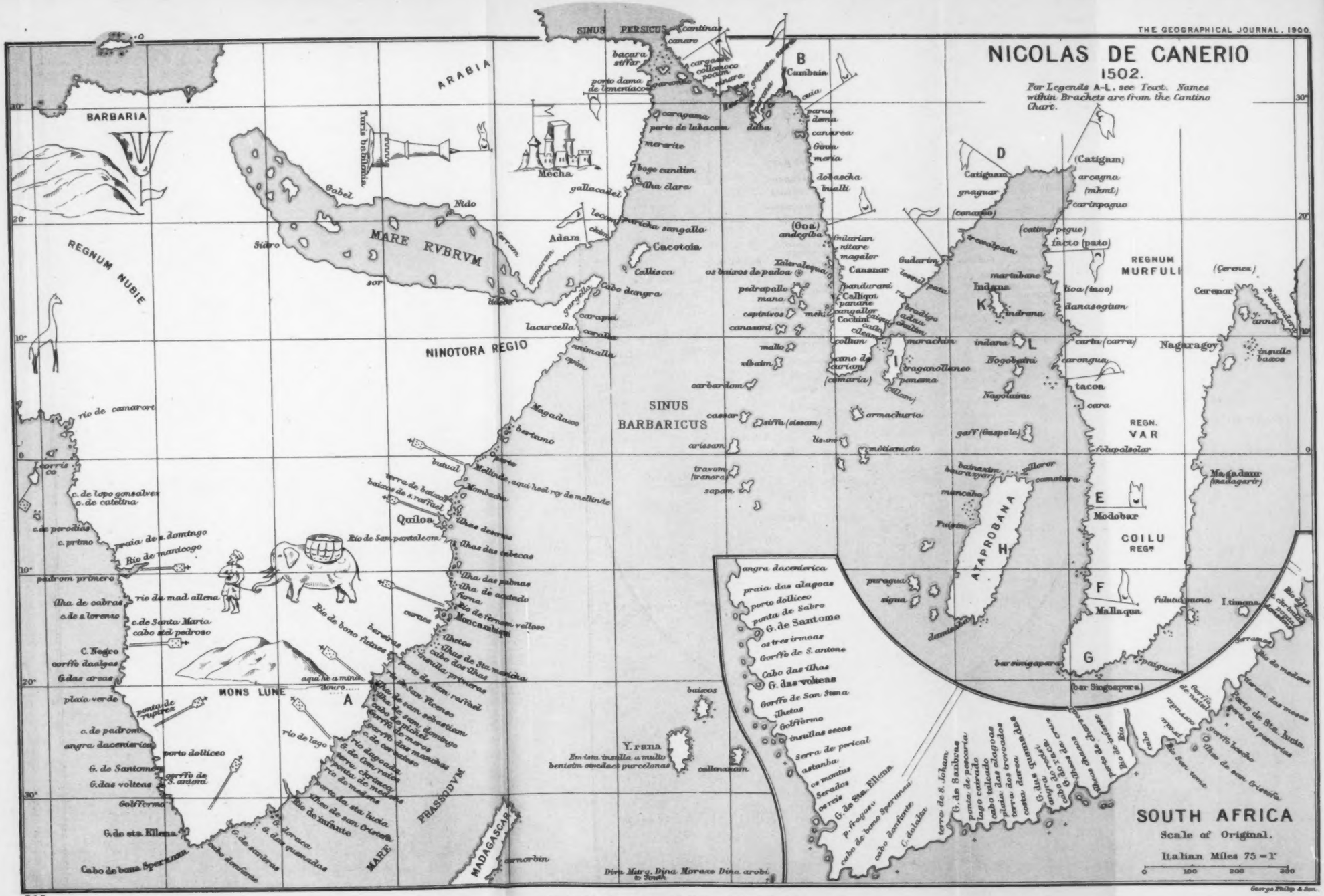

CANTINO'S
CHART.
1502
MONTES LUNE
MARE PRASODŪ
Prasso Promōtorio
Linha equanocialis
Tropicus Capricorni
Ilha de S. thome
Mogodoxo
Pate
Melinde
Mōbaça
Zamzibar
Quilloa
Mocambique
Ilhas de Sam lazaro
Rio de fernam veloso
Ilhas primeras
Rio das boas emaes
Caffalla
Cabo de Sam Sebastiam
Cabo das correntes
Rio da lagoa
Rio das medas douro
Aqui he o Rey de magnicongo o quall Rey mando rogar no Rey don Jua que de tem quo mandasse la freires por que elle se queria tornar cpstum e el Rey os mandou cortes frades da hordem do pedricadores e el Rey e la reyna se tornaram Xpans e os muitos dos de seu povo daqu e este Rey trata cō os da ilha de sante thome e dam escravos por couses de poco preço
aqui he el Rey de Melinde muito nobre e amigo del Rey de portugal
Baixos de Sam Rafaell
el Rey desta cidade he Rey muito nobre e senhorea tuda esta costa s. daqui Pasta çafalla he senhor de mocambique e de çafalla he muyto abondosso douro e de outras cousas
aqui he a myna douro emquo qua muyta abudita mais quem em outra ninkua pte e he descoberta por el Rey de Portugall
Rio de manicōgo
Rio de madalena
Rio de fernam vaz
Rio de sam banas
Rio S. naxare
Rio do corisco
Rio dangra
C. das estreiras
Rio do gemam
C. de lopegoncalues
C. de catazima
C. primero
C. redondo
C. de mestre
C. de pichell
C. negro
C. do padram
C. da conçepçam
C. de Sta. thome
C. de Sam Vitoria
C. de Samx povall
C. de boa esperança
G. das aldeas
G. das areas
G. da balea
G. da conçepçam
G. de Sta. thome
G. de Sta. ellena
Rio de sam lazaro
Rio do Infante
Rio dos Reys
Rio do Spirito Sancto
Rio de Sam Braz
Rio da Cruz
Rio de Sam Thomas
Rio de Sam Domingos
Rio de Sam Antonio
Rio de Sam Jorge
Rio de Sam Christouo
Rio de Sam Nicolao
Rio de Sam Miguell
Rio de Sam Bertolameu
Rio de Sam Mattheus
Rio de Sam Mauricio
Rio de Sam Cosmo
Rio de Sam Damiam
Rio de Sam Simon
Rio de Sam Judas
Rio de Sam Mathias
Rio de Sam Barnabe
Rio de Sam Joham Baptista
Rio de Sam Paullo
Rio de Sam Pedro
Rio de Sam Thiago
Rio de Sam Filipe
Rio de Sam Bertolameu
Rio de Sam Lourenço
Rio de Sam Vicente
Rio de Sam Sebastiam
Rio de Sam Joham
Rio de Sam Lazaro
Rio de Sam Domingos



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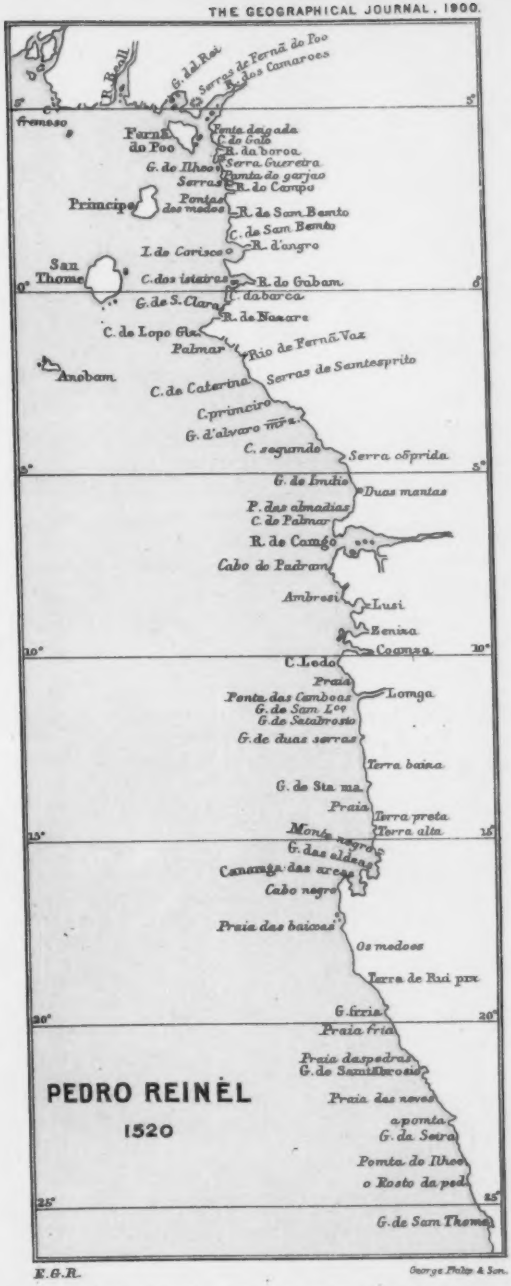

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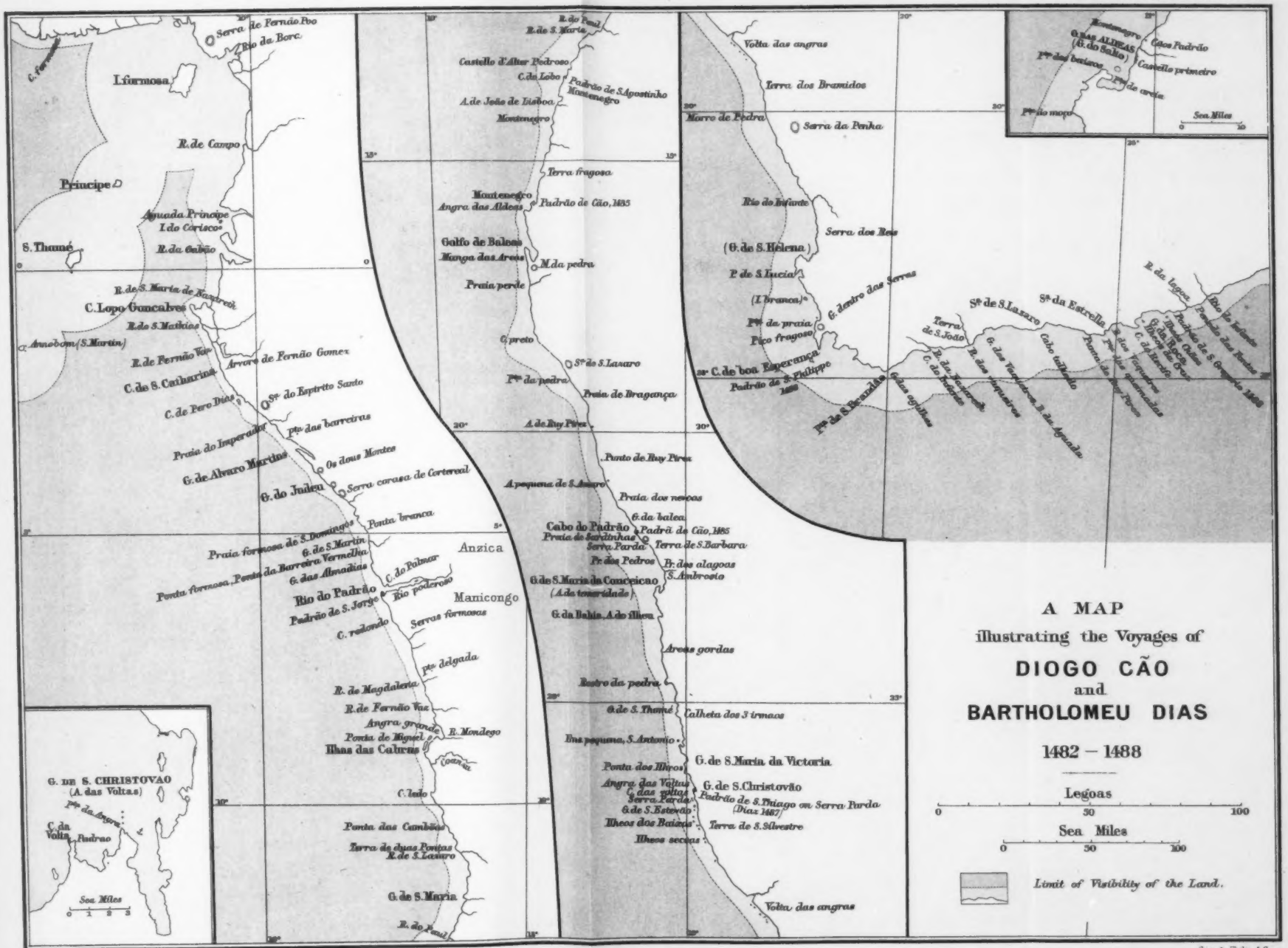
Serra de Fernão Poo
Rio da Borc
Formosa
R. de Campo
Principe
Aguada Principe
I. do Corisco
S. Thomé
R. da Galion
R. de S. Maria de Nazareth
C. Lopo Gonçalves
R. de S. Mathias
C. Arnobom (S. Martin)
R. de Fernão Vaz
Arvore de Fernão Gomez
C. de S. Catharina
C. de Pero Dias
Stª do Espirito Santo
Praia do Imperador
Pta das barreiras
G. de Alvaro Martins
Os dous Montes
G. do Judeu
Serra corasa de Corteveal
Ponta branca
Praia formosa de S. Domingos
G. de S. Martin
Praia formosa, Ponta da Barreira Vermelha
G. das Almadias
Rio do Padrão
Padrão de S. Jorge
C. redondo
C. do Palmar
Rio poderoso
Anzica
Manicongo
Serras formosas
Pta delgada
R. de Magdalena
R. de Fernão Vaz
Angra grande
Ponta de Miguel
Ilhas das Cabras
R. Mondego
C. Ledo
Ponta das Cambôas
Terra de duas Pontas
R. de S. Lazaro
G. de S. Maria
R. do Paul
G. DE S. CHRISTOVAO (A. das Voltas)
Pta da Angra
C. da Volta
Padrão
Sea Miles
R. do Paul
R. de S. Maria
Castello d'Alter Pedroso
C. da Lobo
Padrão de S. Agostinho Montenegro
A. de João de Lisboa
Montenegro
Terra fragosa
Montenegro
Angra das Aldeas
Padrão de Cão, 1485
Golfo de Baleas
Manga das Areas
M. da pedra
Praia perde
C. preto
Stª de S. Lazaro
Pta da pedra
Praia de Bragança
A. de Ruy Pires
Ponto de Ruy Pires
A. pequena de S. Antonio
Praia dos nescos
G. da baleia
Cabo do Padrão
Padrão de Cão, 1485
Praia de Sardinhas
Serra Parda
Terra de S. Barbara
Pr. dos Pedros
Pr. dos alagoas
S. Ambrosio
G. de S. Maria da Conceição (A. de teneridade)
G. da Bahia. A. do Ilheo
Areas gordas
Rastro da pedra
G. de S. Thomé
Calheta dos 3 irmaos
Ilheo pequeno, S. Antonio
G. de S. Maria da Victoria
Ponta dos Ilheos
Angra das Voltas
G. das voltas
Serra Parda
G. de S. Estevão
Ilheos dos Baleas
Ilheos seccos
G. de S. Christovão
Padrão de S. Thiago ou Serra Parda (Dias 1487)
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Volta das angras
Volta das angras
Terra dos Bramidos
Morro de Pedra
Serra da Penha
Rio do Infante
Serra dos Reis
(G. de S. Helena)
P. de S. Lucia
(I. branca)
G. Isidro dos Serres
Pta da praia
Pico fragoso
Terra de S. João
Stª de S. Lazaro
Stª da Estrella
R. da lagoa
Rio do Infante
Pedras de S. Gregorio 1488
G. da Roca
Pedra Ostra
Pedra do Oreo
G. do Infante
G. de Vasquez
G. de Vasquez
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